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THE

CHIRURGICAL WORKS

OF

PERCIVALL POTT, F.R.S.

SURGEON TO ST. BARTHOLOMEW'S HOSPITAL.

WITH HIS LAST CORRECTIONS.

TO WHICH ARE ADDED,

A SHORT ACCOUNT OF THE LIFE OF THE AUTHOR,

A METHOD OF

CURING THE HYDROCELE BY INJECTION,

AND OCCASIONAL

NOTES AND OBSERVATIONS.

BY

SIR JAMES EARLE, F. R. S.

SURGEON EXTRAORDINARY TO THE KING, &c.

A certis potius et exploratis petendum esse præsidium; id est, his quæ Experientia in ipsis curationibus docuerit; sicut in cæteris omnibus artibus: nam ne agricolam quidem aut gubernatorem disputatione, sed usu fieri. A. CORN. CELSUS.

FIRST AMERICAN, FROM THE LAST LONDON EDITION.

IN TWO VOLUMES.

VOL. I.

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A

SHORT ACCOUNT

OF THE

LIFE OF MR. POTT.

A SHORT ACCOUNT, &c.

At the time of Mr. Pott's decease, very few copies of his works remaining in the bookseller's hands, I was prevailed upon to superintend and publish a new edition of them: this, also, having been some time since exhausted, a similar application has been made to me respecting another edition.

The encouraging reception of the former, and the high respect which I must ever retain for the author, are sufficient inducements again to lend any assistance in my power to promote the circulation of his valuable instructions.

The writings of Mr. Pott had been universally read, and many of his improvements in the practice of surgery had come into general use, for several years before his death. Most of his opinions have stood the test of extensive experience; and it is hardly to be doubted, that, whatever improvements have since been or may hereafter be made in this progressive art, his works will be esteemed as a valuable monument of genius and of skill, for the times in which the author lived, to the latest posterity.

The event which put a period to the useful labours of Mr. Pott also closed his account of them; as, to the great disappointment of the medical world, little new on

any chirurgical subject was discovered among the papers of an author, whose pen was seldom long unemployed. This was not the effect of accident or inattention, but of design, for the last years of Mr. Pott's life were not less industriously spent than the earlier part; nor was the spirit of inquiry or of emulation at all diminished by his advanced age, but he had given his friends every reason to expect that no manuscript would be left; and often censured, in strong terms, the imprudence of authors leaving imperfect papers behind them, which their relations seldom have discretion or disinterestedness enough to suppress. My constant intercourse with him, both on business and in his leisure hours, gave me an opportunity of knowing his sentiments on some subjects which had occurred since his last publication. Such of these as materially affected the doctrines he delivered, were noticed in the last edition; and have endeavoured, in the present, still further to correct, arrange, and add, whatever has appeared to me likely to contribute to the general usefulness of the work.

To my last edition I prefixed a short historical account of the author's life, which I presume will not be unacceptable to the readers of this: the thoughts, the conduct, and actions of celebrated men have been generally considered interesting and useful.

My near connexion with the family of Mr. Pott furnished me with the most authentic information concerning every transaction of his life which could in any way interest mankind, and having been already faithfully and correctly detailed, will be reprinted with very few alterations.

Percivall Pott was born on the 26th of December, 1713, in that part of Threadneedle-street which is now

the site of the new Bank-buildings. His father, whose Christian name was Percivall, married the widow of Mr. Houblon, son of Sir Jacob Houblon; and, in 1717, left her again a widow, and him, their only son, with means very inadequate to their support. The deserted state of Mrs. Pott, joined with a deserving character, and many excellent qualities, could not fail of engaging the attention of her friends, among whom was Dr. Wilcox, bishop of Rochester, her distant relation, who took her son under his immediate patronage. Thus she was enabled to pursue a plan for his education and future views in life, which were the principal objects of her maternal solicitude. Mr. Pott returned her tender care with the utmost affection. Indeed, so enthusiastic was his love for his mother, so great the obligations which he always conceived he owed to her, and so unimpaired by time was his remembrance of them, that, to the last, he never mentioned her, but in terms expressive of sensibility and gratitude.

When seven years old, he was sent to a private school, at Darne in Kent, where the instructions, though very confined, were, to a mind of his quick conception, sufficient to form an early taste for classical knowledge; which, by his own assiduity, without further assistance, was afterwards improved to critical accuracy.

Mr. Pott showed, very early, a strong propensity to the profession of surgery. Some of his best friends recommended the church, in which he had no inconsiderable prospects of preferment; but neither advice nor persuasion could alter his fixed determination. He was accordingly, in 1729, bound an apprentice to Mr. Nourse, one of the surgeons of St. Bartholomew's hospital. In this situation he had great opportunities of

improvement, particularly with regard to anatomy, which was at that time little cultivated in London. Mr. Nourse was one of the few who then gave anatomical lectures; his school was at London-house, in Aldersgate-street; and Mr. Pott was employed in preparing the subjects for demonstration, which laid the foundation of his accurate acquaintance with that science, the basis of chirurgic knowledge. In the hospital he found unlimited opportunities of studying the nature and progress of diseases, and of observing practical surgery.

At that time the art was miserably defective; the instruments were clumsy and unmanageable; the operations unscientific, and unnecessarily painful: the established mode of practice, incumbered with a farrago of useless medicines and applications, tended rather to mislead than direct the inquirer; prescription too frequently held the place of reason; and want of real knowledge was concealed under a pompous garb and specious demeanour. Though labouring under these disadvantages, his intuitive genius soon led him to discriminate between right and wrong, taught what to adopt, what to reject; and enabled him afterwards to break through the trammels of prejudice and custom. During his apprenticeship, his natural vivacity did not prevent the application of a very considerable portion of his time to the study of authors in every branch of surgery. Very early in life, he adopted Lord Bacon's advice to a student, to consider one part and one disease at a time, and to become thoroughly acquainted with that before he undertook another: on that plan, he never quitted the immediate object of his inquiry, till he had traced it to every source of information.

Mr. Pott always professed great value and respect for

the early writers on the art, and perused their voluminous works with great diligence and sagacity. He frequently observed, that though no great advantage could be derived from them in the practical part, yet whoever studied them would be amply repaid, by their accurate description of diseases, which they portrayed from nature. But his reading was not confined to professional books; it was various and extensive; and I think I may venture to say, that his memory never suffered any thing to escape which he had once thought worthy a place in his mind.

In 1736, at twenty-two years of age, having finished his apprenticeship, he immediately applied himself to business. Confident in the fair prospects of industry, he hired a house, of considerable rent, in French-church-street, and took with him his mother, and her daughter by the first husband. Such a young man could not long remain unnoticed: the assistance which is given at the entrance into life is most valuable and most disinterested. Of this Mr. Pott was perfectly sensible, and always acknowledged with gratitude the obligations which he owed to the fostering favourers of his youth. As the brilliancy of his talents brought his conversation into much request, his connexions were soon universally extended. Besides the families to which his profession introduced him, he became acquainted with most of his cotemporaries of rising and eminent abilities in every profession. The early friendships which he formed were permanent; and it may truly be asserted, that few men have acquired and retained through life more firm or more respectable friends.

In 1744-5, he was elected an assistant-surgeon, and in 1749 he was appointed one of the principal surgeons

of St. Bartholomew's hospital. He had now before him sufficient scope for the exercise of those abilities by which mankind have since been so much benefited. The state of surgery was still very imperfect, notwithstanding some sensible and ingenious men, both in this country and in France, had published observations which had enlightened and improved it: still the maxim, "*Dolor medecina doloris,*" remained unrefuted; the severe treatment of the old school, in the operative part and in the applications, continued in force; the first principles of surgery, the natural process and powers of healing, were either not understood or not attended to; painful and escharotic dressings were continually employed; and the actual cautery was in such frequent use, that, at the times when the surgeons visited the hospital, it was regularly heated and prepared as a part of the necessary apparatus. In the works of several authors, who flourished in the early part of our author's life, we have contrivances for improving these dreadful instruments. Mr. Pott's tutor rigidly adhered to the established practice, and treated with supercilious contempt the endeavours of his pupil to recommend a milder system. But the dictates of truth soon found a welcome reception with the profession, and with the world in general. Mr. Pott lived to see these remains of barbarism set aside, and a more humane and rational plan, of which he was the chief author, universally adopted. Surgery, being thus divested of great part of its horrors, became, comparatively, a pleasing study; for, except on those unfortunate occasions, when the humane feelings of the practitioner must suffer, from the unavoidable necessity of giving pain, the aim and end of the healing art are surely pleasing. To possess the power as well as the

inclination to relieve distress, to soften anguish, and in some measure to break the force of those accidents and misfortunes, to which mankind are always liable, must afford to every feeling mind the greatest and most sincere pleasure which it is capable of enjoying.

Mr. Pott's affection for his mother prevented him from forming any attachment during her life, which might separate him from her. In 1746, being, to his sorrow, released from this filial engagement, he removed to Bow-lane, and married the daughter of Robert Cruttenden, Esq.; a lady of whom every thing commendable might justly be said, and who, in mental and personal accomplishments, was formed to be his companion.[a]

In the year 1756, an accident befel Mr. Pott; which, though of little consequence in itself, yet, as it displays the vigour and firmness of his mind, and seems to have had considerable influence on his future life, deserves to be recorded in this place:—As he was riding in Kent-street, Southwark, he was thrown from his horse, and suffered a compound fracture of the leg, the bone being forced through the integuments. Conscious of the dangers attendant on fractures of this nature, and thoroughly aware how much they may be increased by rough treatment, or improper position, he would not suffer himself to be moved until he had made the necessary dispositions. He sent to Westminster,

[a] I may now add (1808), that, at the age of 86, Mrs. Pott still retains her excellent understanding and faculties unimpaired. In society, cheerful and interesting, with strong powers of recollection and judgment, she attracts around her the young, the old, the grave, and the gay; and, with a pen equal to that of Madame De Sévigné, instructs and delights a numerous set of correspondents.

then the nearest place, for two chairmen, to bring their poles; and patiently lay on the cold pavement, it being the middle of January, till they arrived. In this situation he purchased a door, to which he made them nail their poles. When all was ready, he caused himself to be laid on it, and was carried through Southwark, over London-bridge, to Watling-street, near St. Paul's, where he had lived for some time—a tremendous distance in such a state! I cannot forbear remarking, that on such occasions a coach is too frequently employed, the jolting motion of which, with the unavoidable awkwardness of position, and the difficulty of getting in and out, cause a great, and often a fatal aggravation of the mischief. At a consultation of surgeons, the case was thought so desperate as to require immediate amputation. Mr. Pott, convinced that no one could be a proper judge in his own case, submitted to their opinion; and the instruments were actually got ready, when Mr. Nourse, who had been prevented from coming sooner, fortunately entered the room. After examining the limb, he conceived there was a possibility of preserving it: an attempt to save it was acquiesced in, and succeeded. This case, which Mr. Pott sometimes referred to, was a strong instance of the great advantage of preventing the insinuation of air into the wound of a compound fracture; and it probably would not have ended so happily, if the bone had not made its exit, or external opening, at a distance from the fracture; so that, when it was returned into the proper place, a sort of valve was formed, which excluded air. Thus no bad symptom ensued, but the wound healed, in some measure, by the first intention.—The appearance of Mr. Pott as an author

was an immediate effect of this accident.[b] During the leisure of his necessary confinement, he planned, and partly executed his Treatise upon Ruptures, which was completed by the latter end of the year. It was then not an early period of his life: and it is possible that the busy scene in which he had hitherto been engaged, might have occupied his mind much longer. As he had been thus led on to the age of forty-three, it is by no means impossible that, without some powerful check to the train of his pursuits, he might never have discovered in himself those superior powers of scientifical disquisition, that correct taste and masterly command of language, which have placed him in the first rank of medical writers. Engaged, from early youth, in the constant transaction of business, he probably till this period had indulged but little in the pleasures of speculative investigation, but was never afterwards long unemployed in some literary work. Indeed, the flattering reception of his publications, and the gratification of communicating to the world scientifical improvements, would have been sufficient to confirm a mind, less ambitious of fame than his, in the habits of an author.

In 1757 he wrote an account of the Hernia Congenita, a complaint not then well understood. Dr. William Hunter, the celebrated anatomist, who was engaged in the same pursuit, inserted a paper in the Medical Commentaries, claiming a priority in the discovery. But I do not mean to enter into the merits of a dispute, which,

[b] I do not find that Mr. Pott had written any thing previous to this, except the relation of a curious case of tumours, by which the bones were softened. This was presented to the Royal Society soon after he began business, and may be found in the 2d part of the 41st volume of the Philosophical Transactions.—It is also inserted at the end of the 2d Vol. of these Works.

though at that time it caught the attention of the medical world, is now nearly forgotten. Mr. Pott's reply was inserted in the second edition of his Treatise on Ruptures, and is written with elegance and urbanity.

His observations on the disorder of the corner of the eye, commonly called Fistula Lachrymalis, appeared in 1758. This sensible, well written performance on a complaint which frequently occurs, has, both in matter and manner, considerable merit. In it he explains the situation, describes the various appearances of the disease, and simplifies the method of cure: his arguments were the principal cause of discontinuing the operation by the actual cautery, which was practised and recommended by Mr. Chesselden, who flourished in the early part of our author's life.

In 1760 was produced his elaborate performance on the nature and consequences of wounds and contusions of the head, fractures of the scull, concussions of the brain, &c. in which, with a perspicuity till then unknown, he separates and arranges the symptoms of each particular species of injury, unfolds the causes and situation of mischief, and points out the most probable means of relief.

In 1762 he published Practical Remarks on the Hydrocele, and some other diseases of the testis, its coats, and vessels, illustrated with cases; being a supplement to his general Treatise on Ruptures.

In 1764 he had the honour to be elected a Fellow of the Royal Society; at the same time, he presented them with a curious and uncommon case of a hernia of the urinary bladder, including a stone, which is inserted in the Philosophical Transactions, Vol. LIV.; and also at the end of these volumes.

As the activity of Mr. Pott's mind was equal to his zeal for the advancement of the art, whatever subject appeared to him to have been least considered, or most defectively treated by others, immediately became the object of his researches, and engaged his particular attention. The fistula in ano next attracted his notice. The nature of this complaint had been much mistaken, and the operations for its relief were consequently injudicious, horridly severe, and destructive of the parts they were intended to relieve. In 1765 he published a treatise on this subject. His method of reasoning on it is clear, ingenious, and conclusive; but they only can be judges of this inestimable work who have compared the simple operation which it recommends with those usually practised in similar cases in this kingdom, until the latter part of Mr. Pott's life, and even at the present time in other countries.

The observations and instructions which thus flowed from his ready pen, were enforced by his practice, and illustrated by oral communication; and he was happy to embrace every opportunity which his situation gave him, of conveying the information he had collected to those who had not the same means of acquiring it.

The humane and benevolent disposition of the people of this country is eminently displayed in the many charitable institutions which abound for the relief and protection of the poor, and in the ample support of them. The beneficial influence of hospitals is not shut up within their walls, nor confined to the objects who are there relieved; the blessings which are there distributed revert to their opulent and noble supporters, and are extended to all ranks and conditions of men, by the improvements which the medical art receives from the stu-

dents who frequent them. In a large hospital there must be opportunities of seeing the greatest possible variety of diseases, such as are either produced or increased by negligence and intemperance, added to those which are met with among the more prudent and better informed part of mankind. In short, all the multiform deviations from health and natural perfection are there, as in one large volume, collected and displayed. Of the advantages arising from such a collection, no person could be more sensible than Mr. Pott; but he also judiciously remarked, that young men often stood in need of an index to point out to them the proper objects for their attention and inquiry. To supply the deficiency, about this time he instituted a course of lectures, the first of which was given at his house in Watling-street. He had not then digested and arranged his ideas, but spoke, as I well remember, with hesitation and reserve: yet even these his first essays bore strong marks of his comprehensive and penetrative mind. In a few courses he overcame all obstacles, and communicated his thoughts with eloquence and ease. He was not satisfied with following any system which had been laid down by others, as he thought they in general dwelt too much on the operative part, which, though very important, is by no means the most difficult part of surgery, nor the most worthy of attention. The means of preventing the necessity of operations, he observed, should be the first consideration; he therefore formed a plan of his own, the best, perhaps, which could be devised. He began with such general disorders as may affect any part of the human frame, and afterwards proceeded to consider the diseases of each part distinctly, beginning with the head, and descending to the inferior members.

He took great pains on every point; and, having the art of being minute without tediousness, demonstrated it with clearness and precision. His manner gave importance to every subject, and impressed his audience with the idea, that the art which he taught was worthy of their highest ambition. He not only explained the best modern practice with his own observations, but rendered the lecture still more curious and interesting, by a review of the practice of the ancients, and of the gradual progress of improvement which had taken place.

This his extensive perusal of authors of all ages had made easy to him; for there was no time of his life when he thought so highly of himself as to imagine that he could receive no light from books. He often said, he began to teach when he had much to learn; and, as he was not actuated by that opinionative wisdom which sometimes attends advanced life, after all his study and experience he confessed, that he still retained a long list of *inquirenda*. His lectures were constantly attended by a numerous succession of pupils, and have been the means of very extensively disseminating much useful knowledge.

In 1768 he produced a new edition of his book on the Injuries to which the Head is liable from External Violence, accompanied with what is entitled A Few General Remarks, but which is really a complete system on fractures and dislocations. This, I have been informed, he began and completed in a fortnight. The novelty of the doctrine contained in this treatise relates principally to the position of the injured limb. On its publication it met with some opposition, but has now subdued the first prejudices; and I believe I may venture to say, is become almost the universal practice.

The frequent avocations of Mr. Pott towards the west end of the town, where the buildings had prodigiously increased since he began life, making a more central situation necessary, in 1769 he purchased a house near Lincoln's-inn Fields, and resided in it seven years, during which time his pen was not inactive. The hydrocele again employed his thoughts. In 1772 he sent to the press his improved method of passing the seton, so as not to rub or injure the gland in its passage.

Mr. Pott took great pains with this subject, and never was perfectly satisfied with what he had done in it. Various other methods have been employed for the cure of this complaint, and practitioners are still divided between them. I must confess that the curative intention does not seem well answered by either of them: they all appear to me to raise more inflammation, and to derange the economy of those tender and sensible parts more than is necessary. I have proposed another, which answers the purpose in a milder and better manner than any I have yet seen; and I feel a satisfaction in saying, that it met with Mr. Pott's approbation. One of our last conversations was on this subject; and, if his life had been prolonged, it was his intention to have practised it.

In 1775, Mr. Pott published Chirurgical Observations relative to the cataract, the polypus of the nose, the cancer of the scrotum, the different kinds of ruptures, and the mortification of the toes and feet, which were valuable additions to his former publications, and were marked with that spirit of observation, perspicuity of reasoning, and candour in discussing controverted points, which distinguish his other productions.

In 1777 he removed to Hanover-square. Here, at

an age when most men begin to think of ease and retirement, his active mind led him into a scene more busy and extensive than ever. Sir Cæsar Hawkins, who had long been employed in many of the first families, retired from London, which made no inconsiderable addition to Mr. Pott's former connexions. But, though engaged in business by day, and occupied at home in the evening, in answering letters addressed to him from all parts of Europe, I might say of the world, having seen many letters in which he was consulted on cases from America, Russia, Turkey, and India, as well as from our neighbouring kingdoms, he contrived to find time to add to his former works a treatise on the necessity of amputation in certain cases, in which he argues strongly in favour of truth and humanity, and clearly proves the rectitude of the principles which he has laid down. This seems principally to have been written in answer to Mr. Bilguer, surgeon to the army of the late King of Prussia, who had published against the necessity of amputating in almost any case. The title of his book is, "De Membrorum Amputatione "rarissimé administrandâ, aut quasi abrogandâ;" and also, in reply to his commentator, Mr. Tissot, who wrote a treatise, "Sur l'Inutilité de l'Amputation des "Membres," in which he goes even beyond his original, and absolutely sets aside the operation as useless; he speaks of it in the most opprobrious terms; he is shocked at the horror of it; exhorts surgeons to abandon the murderous and cruel method of amputation, with many other expressions equally misapplied. Such futile and absurd imputations can never confute what reason and experience have joined to demonstrate, that many lives have been saved by the operation, which

would otherwise have been infallibly lost. However, as we must suppose that the doctrine which these gentlemen have promulgated arose from humane motives, and upon a conviction of its being well founded, we must at least applaud their intention, though we cannot approve their judgment. But if it were possible that any man could be found capable of writing in defence and support of the unfeeling doctrine, that mutilated men are a burthen to the state, and that it is cheaper to enlist men than to cure them, such a work would deserve to be reprobated, and the author's name to be consigned to the detestation of posterity.

In 1779, Mr. Pott published his Remarks on that kind of palsy of the limbs which is frequently found to accompany a particular curvature of the spine. He introduced his first treatise on this subject with doubts and surmises, having just drawn the outline; but, finding his opinion confirmed by experience, he with confidence produced his further remarks on this disease, in 1783, in which he gives a complete description of the complaint, so little understood before, that those who suffered under it were consigned to their fate, which usually led to inactivity, deformity, and death. In this valuable tract he lays down a very accurate discrimination of this from every other species of paralysis, and proposes a new and most efficacious method of stopping its progress, and curing it.

This was the last of his literary productions: the mode of cure which he recommends in it he afterwards applied to diseases of the hip-joint, with considerable success. If his life had fortunately been prolonged, it was his intention to publish his opinions on this subject. At the same time, I have great reason to think he would

have added an account of those very painful excrescences which are frequently the consequence of long-neglected piles. He had been remarkably successful in the treatment of this afflicting complaint, and thought the disease itself not sufficiently understood, nor the mode by which he succeeded commonly practised; but, as it was not his custom to begin to write on any subject till he was prepared to finish it, it is to be lamented that his ideas on these and some other important points were not committed to paper. As Mr. Pott conceived these subjects to be of so much importance, I cannot pass them over in silence, though I much regret that they have not been laid before the public in his comprehensive manner.[d]

The time now began to approach when Mr. Pott may be said to have attained the summit of that eminence which he owed to himself alone. Though unadorned with any honorary distinction in the profession, he was sought after and employed by persons in the first degree of rank and power; and though he solicited neither honours nor favours for himself, he often successfully employed his influence on behalf of others. He was universally consulted; practitioners referred to him in cases of uncommon difficulty and danger, as their last resource; his extensive experience, and his ready application of it, rendered that easy to him, which, to most other men, would have been a painful pre-eminence.

The Royal College of Surgeons in Edinburgh were not inattentive to his deserts. In 1786 he received a diploma, accompanied by a letter expressive of the sense they entertained of them: the value of the honour was

[d] Vide Vol. II.

greatly enhanced by his being the first person on whom they had thought proper to bestow it.[e]

In the following year the Royal College of Surgeons in Ireland presented him with their freedom, in a silver box.[f]

In July 1787 he resigned the office of Surgeon to St. Bartholomew's hospital, after having served it, as he used to say, man and boy, half a century. On the day of his resignation, the annual meeting of the governors was held, and they dined in the great room of the hospital: when he was about to retire, the Right Honourable

[e](COPY.)

"SIR, *Edinburgh, Aug.* 1, 1786.

"It is with peculiar pleasure I obey the commands of the Royal College of Surgeons in acquainting you, that they have this day unanimously elected you an Honorary Fellow of the Royal College of Surgeons of Edinburgh, a compliment which they think your very distinguished merit justly entitled to.

"May I add, as an additional mark of the College's respect, that you are the first Gentleman of the Faculty they have thought proper to bestow the honour on.

"I have the honour to be, &c.

"THOMAS HAY, President."

[f](COPY.)

"HONORARY DIPLOMA

"*Voted to* PERCIVALL POTT, Esq. *Sept. 9th,* 1787, *by the Royal College of Surgeons in Ireland.*

"Whereas it has appeared to us, in full College duly assembled, that Percivall Pott, Esq. has eminently distinguished himself in the science of surgery; now, we being desirous to manifest our approbation of conspicuous merit, do, by virtue of the powers vested in us by his majesty's royal charter, by these presents, elect, constitute, and appoint, the said P. Pott an Honorary Member of this College, with all the privileges, dignities, and immunities thereunto annexed.

(Signed) "J. WHITEWAY, President."

Thomas Harley, president, proposed a health to Mr. Pott, with many thanks for his long, able, and faithful services to that house; which was received with reiterated bursts of applause. Mr. Pott's usual readiness forsook him on this trying occasion: after repeatedly rising to thank the assembly for the compliment they had paid him, he felt himself obliged to sit down in silence. His resolution and presence of mind, though not easily overcome, were not proof against the powerful emotions excited by this public and unexpected testimony of his having acted well, and filled an important station to the advantage of mankind.

It is possible that some of the greatest blessings we enjoy, may, by a fortuitous concatenation of events, tend to shorten their own existence. Thus it seemed in the case of Mr. Pott, whose remarkable temperance had insured him so long a continuance of health and spirits, that he was deceived in himself. Had he been subject to some of the infirmities which usually attend people of his age, as he must necessarily have paid more attention to his general health, his days might possibly have been prolonged. Though he was free from any particular complaint, and his constitution was sound, still it sustained the weight of more than threescore years and ten! to this his mind, busy and cheerful as ever, would not permit him to advert. It is painful to relate, that, in the full possession of his faculties, with a frame of body apparently calculated to last much longer, he fell a sacrifice to his own active disposition, and inattention to the first attack of his disorder.

On Thursday, 11th December, 1788, he went, in very severe weather, to visit a patient about twenty miles from London: when he returned, he complained that

he had caught a cold. The next day he lay in bed, a circumstance very uncommon to him; the following day, thinking himself better, he would not submit to the regimen which had been recommended, but went out as usual; the day after (Sunday the 14th) the cold was remarkably intense, and it being necessary to repeat the visit in the country, I was happy to save him so inclement a journey; but, at my return, was informed that he had been a round of visits in town, and was just got home, perceiving himself unable to complete his list. A shivering soon seized him, and he went to bed; a fever succeeded, and before night he grew delirious. He passed great part of the night in this state; the next morning, on my asking how he found himself, after a short apparent struggle for recollection, the words of his answer precisely were:—"My mind has great propensity "to aberration; and I find myself much inclined to "talk nonsense, unless I studiously collect my thoughts, "and fix them."—Through the whole of his illness, during the intervals of reason, his observations on many subjects were remarkably sensible and pointed; and he seemed particularly attentive to correctness in his language. The description of the pain he felt was anatomically exact. He did not appear to doubt of his recovery during several days, though the fever continued, with unremitting violence, in opposition to the best medical assistance, being attended with the most affectionate assiduity, by the late Dr. Heberden, Sir Francis Millman, and the late Dr. Austin. His head became rather more clear as the disorder advanced, and he seemed more sensible of his danger; on the seventh day he observed, "My lamp is almost extinguished; I hope "it has burned for the benefit of others." On the following day, the 22d of December, he expired.

His remains were attended by many of his relations and friends to Aldermary church in Bow-lane, where they were deposited near those of his beloved mother.

On a marble tablet affixed to the wall is the following inscription, by his son the Rev. Joseph Holden Pott, A. M. Archdeacon of St. Alban's, &c.

In Memory

Of PERCIVALL POTT, Esq. F. R. S.

Surgeon of St. Bartholomew's Hospital during Forty-two Years,
Who departed this Life, December 22d, 1788, aged 75.

He was
Singularly eminent in his Profession,
To which he added many new Resources, and which he illustrated
With matchless Writings.
Let Posterity revolve the Sum of his Experience,
That the World may still enjoy the Benefit of his
Successful Practice.
He honoured the collective Wisdom of past Ages:
The Labours of the Ancients were familiar to him:
He scorned to teach a Science of which he had not traced the growth;
He rose, therefore, from the Form to the Chair.
Learn, Reader, that the painful Scholar can alone become
The Faithful Teacher.
But his Studies had a double Issue:
Whilst he gathered the Knowledge of his Predecessors,
He perceived their Errors, and corrected them;
He discovered their Defects, and supplied them.
Original in Genius, prompt in Judgment, rapid in Decision,
He directed Knowledge to its proper Ends;
But pursued them when the Aids of Information were exhausted;
The last Steps, therefore, and great Improvements,
Were his own.

His Integrity is before his Judge;
Without it, his Skill might have profited Mankind,
But could have claimed no Record within these Walls.

His private Virtues,
His signal Tenderness to his Family,
Completed an Example,
Amiable, Useful, Great.

The genius of Mr. Pott, however assisted by art, was certainly of the first order by nature, as appears by the variety and perfection of his attainments. He was the most eminent of his time as a writer, as a teacher, and as a practitioner in surgery; and his merits in each of these characters were most extensive. Possessed with an enthusiastic love of excelling, without which genius is inert, he was not contented with any kind of mediocrity in himself.

As an author, his language is correct, strong, and animated. There are few instances, if any, of such classical elegance, united with so much profound scientifical acuteness. In his surgical inquiries he studiously avoided reference to obscure and general principles; he preferred reasoning by analogy and induction from established facts; a method certainly more safe and more accommodated to the present state of physiological knowledge. He introduces anatomy and physiology, whenever it is necessary, to illustrate and distinguish diseases; but never confuses his reader with uncertain hypothesis in pathology, founded on physiological principles. He was of opinion, and it is the opinion of Newton, that hypothesis has no place in any physical science. To place the disease in a distinct point of view; to demonstrate wherein it consisted, and the changes which must be effected to remove it; to point out the remedies which would most safely and certainly produce those changes, were the objects to which he directed his whole attention. His remedies always strongly marked his intention; they were decided and consistent; and he was the principal author of that simplicity which distinguishes the present practice from

that of our ancestors. With these views he applied himself to every part of the surgical art, and improved both the pathology and cure of many diseases. His treatment of fistulous sores, and his history and cure of the caries of the corpora vertebrarum, were, perhaps, his greatest works: but his improvements, as we have seen, extended to many other subjects; and his researches introduced such novelties in the practice of surgery, that his life must ever be considered as a great epoch in the history of that art.

As a teacher, he had acquired the faculty of speaking readily, with great point and energy, of delivering the most prolix and intricate sentences with incredible perspicuity and correctness, and of enforcing what he said with a most harmonious and expressive elocution. He allowed no excuse for defects in himself; he always avowed that excellent maxim,—

> ————Cui lecta potenter erit res,
> Nec facundia deseret hunc, nec lucidus ordo.

As a practitioner in surgery, we must apply to him all the essential qualifications, sound judgment, cool determination, and great manual dexterity. He had seen much of practice, and what he had seen he had digested, by reading, writing, and lecturing on those subjects.

In the transaction of business there was a freedom and openness in his manner, which evidently arose from a consciousness that the opinion which he delivered was founded on experience. In every instance he shunned affectation and singularity; and his conduct in all situations was an appeal to the good sense of mankind.

Thus he acquired the universal confidence of the profession; and, without any accidental or external help, he raised himself to the greatest dignity which man can attain—the first rank in a liberal profession.

Domestic virtues make no great figure in history; yet the domestic virtues of distinguished men should not be forgotten, because they promote the cause of virtue; besides, great and amiable qualities reflect lustre on each other. The ambition, the industry, and enterprise of Mr. Pott, did at no time interfere with the duties of a husband and a father. Though his ready wit and brilliant conversation, abounding with interesting anecdotes of his own observation, and with happy quotations from modern and ancient authors, rendered him a conspicuous character in all parties, he was most happy, and not less to be admired, in the circle of his family. In their society, he spent much the greater part of his leisure hours, and in such a manner as to be the object of the utmost affection and veneration to a numerous offspring of children and grand-children.

The person of Mr. Pott was elegant, though lower than the middle size; his countenance animated and expressive; his manners and deportment were graceful; and his remarkable vigour and activity seemed unabated by age.

The labours of the greatest part of his life were without relaxation;—an increasing family required his utmost exertion. Of late years he had a villa at Neasden; and in the autumn usually passed a month at Bath, or at the sea-side. Thus, though he gathered, as he expressed it, some of the fruit of the garden which he had planted as he went along, and always lived in a generous

and hospitable manner, at the same time bestowing on four sons and four daughters a liberal and necessarily expensive education, and applying large sums to their establishment during his life-time, he left an ample provision for them at his decease. Among his papers was found, what he had often mentioned, a small box, containing a few pieces of money,* being the whole which he ever received from the wreck of his father's fortune. With this was deposited an exact account of every individual fee which a long life of business had produced—abundant evidence of well-spent time, and the industrious application of abilities, to which the *res angusta domi*, at the commencement, probably acted more powerfully as an incentive than as an obstacle.

J. E.

Hanover-Square, January 1st, 1808.

* Under 5*l.*

OBSERVATIONS

ON THE

NATURE AND CONSEQUENCES

OF THOSE

INJURIES

TO WHICH

THE HEAD IS LIABLE

FROM

EXTERNAL VIOLENCE.

SECT. I.

WOUNDS OF THE SCALP.

PREVIOUS to an account of such wounds and injuries of the head as interest the scull, the brain, and its membranes, it may not be amiss to take some small notice of those to which the scalp is liable. Though this be called the common tegument of the head, yet, from the variety of parts of which it is composed, from their structure, connexions, and uses, injuries done to it by external violence become of much more consequence than the same kind of ills can prove when inflicted on the common teguments of the rest of the body.

The covering, called the scalp, consists of the cutis, the membrana adiposa, or cellularis, the expanded tendons of the frontal, occipital, and temporal muscles, (forming a kind of aponeurosis,) and the membrane which immediately covers the bones of the scull, called therefore the pericranium.

This variety of parts, upon the infliction of wounds, blows, &c. frequently occasions a variety of symptoms; which symptoms ought by practitioners to be carefully and properly distinguished from each other; not only because they often arise from the distinct and particular nature of the part injured, but because they generally point out the most effectual means of relief. If to these considerations we add another, no less true and important, viz. that there is and must be a constant communication, by means of blood-vessels, between all the parts without and within the head, it will appear, that injuries done to this part, though seemingly, and at first sight, slight and trivial, may sometimes prove of the greatest consequence.

I will not waste the reader's time, by entering into a detail of

the method of treating common incised wounds; but proceed immediately to those which, though the mischief be originally confined to the mere scalp, yet are frequently very terrible to behold, are often attended with alarming symptoms, and sometimes with danger. These are what are called lacerated wounds, and those made by puncture. The former may be reduced to two kinds, viz. those in which the scalp, though torn, or unequally divided, still keeps its natural situations, and is not stripped or separated from the cranium to any considerable distance beyond the breadth of the wound; and those, in which it is considerably detached from the parts it ought to cover.

The first of these, if simple, and not combined with the symptoms or appearances of any other mischief, do not require any particular or different treatment from what the same kind of wounds require on all other parts; but the latter (those in which the scalp is separated and detached from the parts it ought to cover) are not only, by the different methods in which they may be treated, frequently capable of being cured with a considerable deal more or less ease and expedition, but prove also sometimes matter of great consequence to the health and well-being of the patient. Both writers and practitioners differ much in their advice and conduct on this subject. With some it is a practice immediately to remove such portion of the scalp as is fairly and perfectly detached from the parts underneath; with others, to attempt its preservation.

Each of these opinions can be considered, in a general sense only, not as applicable to every individual case without distinction; and taken in such general consideration, they cannot be both right. It may therefore be worth while to inquire, what reasons each party has to give for its opinion and conduct.

They who advise the removal affirm, that when a large portion of the scalp has been perfectly and totally separated from the parts it ought to cover, and that for some considerable space, it will not again coalesce or unite with such parts; and therefore that an attempt to procure such union, by replacing the separated piece, will only protract the time of cure, by furnishing a lodgment for matter and sloughs, which matter and sloughs must prevent the thing intended. That in case of large wounds, or of

those produced by great force, as we cannot by any means be absolutely certain that no mischief is done to the parts under the cranium, the replacing the lacerated scalp may not only prevent our immediate inquiry into the nature of such mischief, but may conceal and hide (at least for a time) such future appearances as might furnish indications to direct a surgeon's conduct.

They who advise the preservation of the separated scalp,[a] do it upon a supposition, that it will in general unite again; that if it do, the patient may thereby be spared a great deal of pain, save much time, and sustain much less deformity; that with regard to the immediate inquiry into the state of the cranium, it may be made before the scalp is replaced; that if there be no present symptoms which indicate injury done to the parts underneath, it would be absurd to act merely upon the presumption that there may be some in future; that it will be more proper and vindicable to do what is right at first, or according to the present circumstance, and to attend to what *may* happen or occur hereafter, when such occurrences have happened; and that the formation of matter and sloughs, under the detached and replaced portion, will not, in general, under proper management, prevent its re-union.

It is to be presumed, that every practitioner wishes to cure his patients as soon as he can, by the least painful means, and in such manner as shall be productive of the least possible deformity or defect; taking care at the same time, not to be inattentive to any evil which may arise, nor to omit or neglect doing whatever may be necessary during such cure.

Upon this principle, I make no scruple of declaring it as my opinion, that the preservation of the scalp ought always to be attempted, unless it be so torn as to be absolutely spoiled, or there are manifest present symptoms of other mischief. This kind of wound is sometimes very terrible to look upon, and they who have not been accustomed to see it, may be inclined to think there is no remedy but excision: but I have so often made the experiment of endeavouring to preserve the torn piece, and have so often succeeded, that I would recommend it as a thing always to be at-

[a] I presume I need not observe, that when I say *separated*, I mean only with regard to the inferior surface of such piece, and that it is still contiguous with some part of the skin.

tempted, even though a part of the cranium should be perfectly bare, unless the two circumstances already mentioned render it improper or impracticable. The removal of it necessarily produces a larger sore, which must require a good deal of time to heal, and must leave a considerable deformity: the preservation of it prevents both.

Therefore, when such case occurs, let the surgeon be particularly careful to examine, whether there be any appearances, or symptoms, of any other kind of mischief beside what the scalp has sustained; and if there be neither, let him make the torn piece clean from all dirt, or foreign bodies, and restore it quickly, and as perfectly as he can, to its natural situation.[b]

[b] The distance from the place where the accident happens, and other causes, frequently prevent the surgeon from examining the wound, until a considerable time has elapsed, when, without any application having been made to it, the surface of the torn scalp, and the parts which adhere to the cranium, are become dry, and are apparently not in a state to heal by the first intention; or some dressings may have been applied, which, by the nature of them, and by keeping the parts separate, add to the indisposition to unite. In either of these cases, notwithstanding many hours may have intervened, this excellent idea of saving the scalp need not be abandoned; on the contrary, after the wound has been thoroughly washed and cleansed, the surfaces of it should be lightly scarified with the point of a lancet; when, being thus refreshed, and yielding a small effusion of blood, the immediate union between them will probably take place, provided they are brought into contact, and retained as Mr. Pott directs.—To explain my meaning, I will select the following instance: A gentleman, about twenty years old, thrown from his horse, and entangled in the stirrup, received a kick on the forehead. As he was at a great distance from London, I did not see him till forty hours after the accident: he had been, and still continued, in a state of insensibility: the horse's shoe had struck him on the edge of the orbit, and had torn the eye-brow and nearly one half of the covering of the forehead, which was raised, and formed a flap. The wound, which was very large, had been filled soon after the accident, with lint: it immediately occurred to me, that, if it were suffered to heal in this situation, the consequent deformity must be deplorable. I therefore removed the dressings, and found the os frontis denuded in two places: there was no fracture, except of a small portion of bone, which had been broken off from the edge of the orbit, and his symptoms were those of general concussion. I conceived it would be right to endeavour to procure an union of the separated parts, though from the length of time since they had been divided, and from the dressings, which had left the fibres dry and constringed, they appeared very ill disposed to unite. However, after having got rid of the remainder of the lint,

The manner in which it is to be there maintained, must a good deal depend upon the particular circumstances of each individual case, and therefore must be left to the surgeon, who will make use of plaster, bandage, and suture, together or separately, as

and made it perfectly clean with warm water, I scarified the whole internal surface of the detached scalp, and the parts of the muscle which still adhered to the bone, which his absence of perception enabled me to perform freely. I then brought them into contact, and retained them in that situation by the dry suture. I had the satisfaction to find them unite by the first intention, making a simple line nearly down the middle of the forehead. By proper treatment he soon regained his senses; and a small exfoliation from the edge of the orbit, at the bottom of the wound, was the only circumstance which for some time retarded the perfect cure.

I will mention another case in which very different treatment, but equally wrong, had taken place before I saw the patient:—

A man sitting on the shafts of a loaded waggon fell down in a fit: as he lay on his face, the wheel passed over the right side of the head, tore off the whole of the scalp from the parietal and temporal bones, and from part of the frontal bone. The integuments also which covered the under part of the orbit and cheek were much torn and bruised: in short, a more completely mangled and shocking object can scarcely be imagined.

The whole of this large wound I found covered with a soft greasy poultice. On taking it off, though the wound had been in some measure washed and cleansed, the remaining mud mixed with blood presented the appearance of a dirty quagmire, in which the wounded portions were loose and floating, but still retained some connexion with the neighbouring parts. The poultice had been applied all night, and part of the day. It is evident at first sight that the consequence of the continuance of such application must be the sloughing and destruction of all these parts; and if life were preserved, the poor sufferer must remain a miserable object. I therefore ordered it to be well cleansed in every part with warm water, the doing of which completely was not an easy task. When this was thoroughly accomplished, I scarified freely every part of the wound over the whole surface of the parts which still adhered to the bones as well as the inside of the torn portions of scalp, which, though so ragged, so torn to shreds and tatters that I thought it impossible that they should all unite, I would not suffer to be removed, but gave them all a chance, thinking that those parts which should die from want of circulation, might easily be taken away at some future opportunity. I then brought all the parts as nearly as possible into their natural situation, and retained them by means of ligatures, strips of sticking plaster, and bandages lightly applied.

Some blood was taken from the arm, which, with open bowels and a low diet, prevented considerable inflammation from coming on. From day to day such strips of sticking plaster as were loose were removed, and others

he shall find them most convenient, and best fitted to the purpose.

I am aware that the very mention of a suture in a wound of the scalp, particularly a lacerated one, will startle some of my readers, who have been taught that it is always wrong in both; I know that this is the general doctrine, but I know also, that although it be sometimes true, yet, if it be implicitly adhered to, it will prevent a practitioner now and then from receiving very useful assistance. A stitch, made with a slip-knot, will sometimes hold the divided parts in such situation, as will greatly expedite a cure: in many cases a very short time will answer the end, and the thread may be removed as soon as ever the purpose is accomplished, or the suture becomes either improper or useless.

In some cases this will be all that is required; the loosened scalp will unite with the parts from which it was torn and separated, and there will be no other sore, than what arises from the impracticability of bringing the lips of the wound into smooth and immediate contact, the scar of which sore must be small in proportion.

On the other hand, it sometimes happens that such perfect reunion is not to be obtained; in which case, matter will be formed and collected in those places where the parts do not coalesce: but this does not necessarily make any difference, either in the general intention, or in the event: this matter may easily be discharged, by one or two small openings made with a lancet; the head will

applied. In the progress of a few days I was agreeably surprised to see that in general an union had taken place, except on the sides of some of the smaller portions of the detached scalp, and the extremities of others which remained black and lifeless, and which of course were taken away; and particularly there was a small portion under the eye, which, being dead for want of a nourishing vessel, sloughed and came away, and threatened a considerable disfigurement. The loss however was greatly remedied by bringing the neighbouring parts as nearly together as possible. In no great length of time the whole wound was healed, when all those who had witnessed the accident, and observed its progress toward amendment, as well as myself, were astonished at the little scar or deformity left from so extensive and complicated a wound.

I may add, that the man, before the accident, had been reckoned handsome, and the front view of his face afterward still retained its comely appearance. E.

still preserve its natural covering; and the cure will be very little retarded by a few small abscesses.

I must desire not to be misunderstood: I do not mean to say, that it must be always and invariably right, to return the loosened scalp, and to endeavour to procure its immediate re-union, or that such attempt will always succeed; I only mean to signify, that it is my opinion, (and that founded on experience,) that the mere separation or detachment of the scalp, to however large an extent, is not a good and sufficient reason for cutting off any part of it in cases where no other mischief seems to have been done, in which the cranium is uninjured, and the parts within it unhurt; and, that the attempt to procure a re-union with the parts from which it was separated, though it will sometimes fail, yet will most frequently succeed; and is always worth making; as such experiment, properly made, can never be attended with any real inconveniences.

In some cases, the whole separated piece will (as I have said before) unite perfectly, and give little or no trouble, especially in young and healthy persons; in some, the union will take place in some parts, and not in others; and consequently matter will be formed, and require to be discharged, perhaps at several different points; and in some particular cases, circumstances, and habits, there will be no union at all: the torn cellular membrane, or the naked aponeurosis, will inflame and become sloughy, a considerable quantity of matter will be collected, and perhaps the cranium will be denuded: but even in this state of things, which does not very often happen where proper care has been taken, and is almost the worst which can happen in the case of mere simple laceration and detachment, I say, even in this, if the surgeon will not be too soon, nor too much alarmed, nor in a hurrry to cut, he will often find the cure much more feasible than he may at first imagine: let him take care to keep the inflammation under by proper means; let him have patience till the matter is fairly and fully formed, and the sloughs perfectly separated; and when this is accomplished, let him make a proper number of dependent openings for the discharge of them; and let him by bandage, and other proper management, keep the parts in constant contact with each other, and he will often find, that, although he was foiled in his first intention, of procuring immediate union, yet he will frequently succeed in

this his second; he will still save the scalp, shorten the cure, and prevent the great deformity arising (particularly to women) not only from the scar, but from the total loss of hair.

I have said, that this union may often be procured, even though the cranium should have been perfectly denuded by the accident; and it is true, not only though it should have been stripped of its pericranium at first, but even if that pericranium should have become sloughy and cast off, as I have often seen.

Exfoliation from a cranium laid bare by external violence, and to which no other injury has been done than merely stripping it of its covering, is a circumstance which would not so often happen, if it were not taken for granted that it must be, and the bone treated according to such expectation: the soft open texture of the bones of children and young people will frequently furnish an incarnation, which will cover their surface, and render exfoliation quite unnecessary; and even in those of mature age, and in whom the bones are still harder, exfoliation is full as often the effect of art, as the intention of nature, and produced by a method of dressing, calculated to accomplish such end, under a supposition of its being necessary. Sometimes indeed it happens that a small scale will necessarily separate, and the sore cannot be perfectly healed till such separation has been made: but this kind of exfoliation will be very small and thin, in proportion to that produced by art, which is, that produced by dressing the surface of the bare bone with spirituous tinctures, &c.; and when a wound on the head, with a sound uninjured bone, denuded by accident, shews a disposition to heal without exfoliation, it never can be right to counteract nature, and oblige her to do that she is not inclined to, and which she would otherwise accomplish better.

If the scalp be detached by such means, or with such force of instrument, that the scull or parts within it have suffered, then the immediate union of the skin becomes impracticable, and it would be highly injudicious to attempt it: our attention then must be paid to the greater evil; it then becomes another kind of case, and all that need be said of it in this place is, that although such mischief do generally require the removal of some part, yet even in this situation, no more of it should be cut off than what will be necessary for the detection and proper treatment of such mischief.

In short, whether considered as skin, or as the seat of the hair, it ought never to be removed wantonly, or without absolute necessity.

Small wounds, that is, such as are made by instruments or bodies which pierce or puncture rather than cut, are in general more apt to become inflamed, and to give trouble, than those which are larger; and in this part particularly are sometimes attended with so high inflammation and with such symptoms, as alarm both patient and surgeon.

The parts capable of being hurt by such kind of wound, are the skin, the tela cellulosa, the expanded tendons of the muscles of the scalp, and the pericranium.

If the wound be no deeper than the cellular membrane, and has not reached the aponeurosis or pericranium, the inflammation and tumour affect the whole head and face, the skin of which wears a yellowish cast, and is sometimes thick set with small blisters, containing the same coloured serum; it receives the impression of the fingers, and becomes pale for a moment, but returns immediately to its inflamed colour; it is not very painful to the touch, and the eye-lids and ears are always comprehended in the tumefaction, the former of which are sometimes so distended, as to be closed; a feverish heat and thirst generally accompany it; the patient is restless, has a quick pulse, and most commonly a nausea, and inclination to vomit.

This accident generally happens to persons of bilious habit, and is indeed an inflammation of the erysipelatous kind; it is somewhat alarming to look at, but it is not often attended with danger. The wound does indeed neither look well, nor yield a kindly discharge, while the fever continues, but still it has nothing threatening in its appearance, none of that look which bespeaks internal mischief; the scalp continues to adhere firmly to the scull, and the patient does not complain of that tensive pain, nor is afflicted with that fatiguing restlessness which generally attends mischief underneath the cranium.

Phlebotomy, lenient purges, and the use of the common febrifuge medicines, particularly those of the neutral kind, generally remove it in a short time. When the inflammation is gone off, it leaves on the skin a yellowish tint, and a dry scurf; which con-

tinue until perspiration carries them away, and upon the disappearance of the disease, the wound immediately recovers a healthy aspect, and soon heals without any further trouble.

Wounds and contusions of the head, which affect the brain and its membranes, are also subject to an erysipelatous kind of swelling and inflammation; but it is very different, both in its character and consequences, from the preceding.

In this (which is one of the effects of inflammation of the meninges) the febrile symptoms are much higher, the pulse harder and more frequent, the anxiety and restlessness extremely fatiguing, the pain in the head intense; and as this kind of appearance is, in these circumstances, most frequently the immediate precursor of matter forming between the scull and dura mater, it is generally attended with irregular shiverings, which are not followed by a critical sweat, nor afford any relief to the patient. To which it may be added, that in the former case the erysipelas generally appears within the first three or four days; whereas in the latter, it seldom comes on till several days after the accident, when the symptomatic fever is got to some height. In the simple erysipelas, although the wound be crude and undigested, yet it has no other mark of mischief; the pericranium adheres firmly to the scull, and, upon the cessation of the fever, all appearances become immediately favourable. In that which accompanies injury done to the parts underneath, the wound not only has a spongy, glassy, unhealthy aspect, but the pericranium in its neighbourhood separates spontaneously from the bone, and quits all cohesion with it. In short, one is an accident, proceeding from a bilious habit, and not indicating any mischief beyond itself; the other is a symptom, or a part of a disease, which is occasioned by injury done to the membranes of the brain; one portends little or no ill to the patient, and almost always ends well; the other implies great hazard, and most commonly ends fatally. It is therefore hardly necessary to say, that it behoves every practitioner to be careful in distinguishing them from each other.

If the wound be a small one, and has passed through the tela cellulosa, to the aponeurosis, and pericranium, it is sometimes attended with very disagreeable, and even very alarming symptoms,

but which arise from a different cause, and are very distinguishable from what has been yet mentioned.

In this the inflamed scalp does not rise into that degree of tumefaction, as in the erysipelas; neither does it pit, or retain the impression of the fingers of an examiner: it is of a deep red colour, unmixed with the yellow tint of the erysipelas: it appears tense, and is extremely painful to the touch. As it is not an affection of the tela cellulosa, and as the ears and the eye-lids are not covered by the parts in which the wound is inflicted, they are seldom, if ever, comprehended in the tumour, though they may partake of the general inflammation of the skin: it is generally attended with acute pain in the head, and such a degree of fever as prevents sleep, and sometimes brings on a delirium.[c]

A patient in these circumstances will admit more free evacuations by phlebotomy, than one labouring under an erysipelas: the use of warm fomentation is required in both, in order to keep the skin clean and perspirable; but an emollient cataplasm, which is generally forbid in the former, may in this latter case be used to great advantage.

When the symptoms are not very pressing, nor the habit very inflammable, this method will prove sufficient: but it sometimes happens, that the scalp is so tense, the pain so great, and the symptomatic fever so high, that by waiting for the slow effect of such means, the patient runs a risque from the continuance of the fever; or else the injured aponeurosis and pericranium becoming sloughy, produce an abscess, and render the case both tedious and troublesome. A division of the wounded part by a simple incision down to the bone, about half an inch or an inch

[c] In the last lecture which Mr. Pott gave on this subject, he candidly observed, that he found he had drawn the line of distinction between those wounds by which the tela cellulosa alone is hurt, and those which penetrate through and puncture the aponeurosis and pericranium, too decidedly, and said he was convinced, that the different symptoms which he had supposed to follow the wound of this or that part, often arose from the constitution and habit of the person wounded, rather than from the nature of the accident, and that the consequences could not always be deducible from the particular part which had received the injury; for that, since he had written on the subject, he had remarked the same symptoms indiscriminately arising from either kind of wound. E.

in length, will most commonly remove all the bad symptoms, and if it be done in time, will render every thing else unnecessary.

The injuries to which the scalp is liable from contusion, or the appearances produced in it by such general cause, may for methodsake be divided into two classes, viz. those in which the mischief is confined merely to the scalp, and those in which other parts are interested.

The former, which only comes under our present consideration, is not indeed of importance, considered abstractedly. The tumour attending it is either very easily dissipated, or the extravasated blood causing it, is easily got rid of by a small opening. I should not therefore have thought it of such consequence, as to be worth mentioning in this place, had it not been for an accidental circumstance, which sometimes attends it, and renders it liable to be very much mistaken.

When the scalp receives a very smart blow, it often happens that a quantity of extravasated blood immediately forms a tumour, easily distinguishable from all others, and generally very easily cured. But it also sometimes happens, that this kind of tumour produces to the fingers of an unadvised or inattentive examiner, a sensation, so like to that of a fracture, with depression of the cranium, as may be easily mistaken. Now, if upon such supposition, a surgeon immediately removes the tumid scalp, he may give his patient a great deal of unnecessary pain, and for that reason run some risque of his own character.

The touch is, in this case, so liable to deception, that recourse should always be had to other circumstances and symptoms, before an opinion be given.

If a person, with such tumour occasioned by a blow, and attended with such appearances and feel, have any complaint, which seems to be the effect of pressure made on the brain and nerves, or of any mischief done to the parts within the cranium, the division or removal of the scalp, in order to inquire into the state of the scull, is right and necessary; but if there be no such general symptoms, and the patient be in every respect perfectly well, the mere feel of something like a fracture will not authorise or vindicate such operation, since it will often be found, that such sensation is a deception, and that when the extravasated fluid is

removed, or dissipated, the cranium is perfectly sound and uninjured.

The second kind of tumour attending the contused scalp, viz. that which arises from injury done to the cranium, and parts within, does so absolutely proceed from, and depend upon such injury, as not to fall under our consideration in this place at all, but will be considered at large when we come to speak of the mischiefs done to the scull and brain by collision, or contusion.

From what has been said it appears, that the scalp, taken in a general sense, is, when wounded or bruised, liable to be affected with four kinds of tumour, each of which has a distinct cause, and requires, or permits, a different method of treatment.

The first does not imply any injury done to the parts within the scull, requires no operation, and almost always is cured by general remedies.

The second, or that which is caused by the spontaneous separation of the pericranium from the scull, in consequence of internal mischief, is not at first attended with very pressing symptoms; but whoever has observed their progress, and attended to their event, must know what fatal and frequently irresistible evil it is the forerunner of, nothing less than the inflammation and putrefaction of the membranes of the brain, and the formation of matter between them and the scull; and that it is a case which, of all others, will least admit delay.

The third, though it sometimes gives way to free evacuation, and lenient external applications, yet is sometimes also attended with symptoms which are too pressing to wait the effect of such remedies, and is capable of being immediately relieved by a division of the inflamed and irritated parts; whereas the same incision, made into the first kind of tumefaction, would most probably exasperate the disease, and heighten the symptoms.

The fourth, consisting of extravasated blood, seldom requires any chirurgic operation; time, and the use of the common discutient applications,[d] almost always dissipate it; and it only becomes of consequence by the possibility of its being misunderstood and mistreated.

[d] Among which I know of none equal to a solution of crude fal almon. in vinegar and water, or spt. vin.

SECT. II.

EFFECTS OF CONTUSION ON THE DURA MATER, AND PARTS WITHIN THE SCULL.

In order to understand rightly, and to have a clear idea of this kind of injury, it is necessary to recollect, that the vessels of the pericranium, those of the diploe, or medullary substance between the two tables of some parts of the cranium, and those of the dura mater within it, do all constantly and freely communicate with each other; and that this communication is carried on by means of innumerable foramina, found in all parts of both surfaces of the scull, as well as at the sutures; that upon the freedom of this communication depends the healthy and sound state of all the parts concerned in it; and that from the interruption or destruction of this proceed most of the symptoms attending violent contusions of the head, extravasations of fluid between the cranium and dura mater, inflammations of the said membrane, and simple undepressed fracture of the scull.

The pericranium is so firmly attached to the outer surface of the scull, as not to be separable from it without considerable violence; and when such violent separation is made in a living subject (especially if young) the cranium is always seen to bleed freely, from an infinite number of small foramina. The dura mater, which is a firm strong membrane, is almost as intimately attached to the inside of the scull, as the pericranium is to the outside, and by the same means, viz. by vessels; and by these means a constant circulation and communication are preserved and maintained between the two membranes and the bones dividing them. This, all the appearances which attend the scalping a living person, or the separation of the scull from the dura mater of a dead one, (especially if such person died apoplectic, or was hanged,) prove beyond all doubt: in the former, the blood will (as I have already observed) be seen issuing from every point of the surface of the cranium; in the latter, not only a considerable degree of force will be found necessary to detach the sawed bone from the

subjacent membrane, but when it is removed, a great number of bloody points will be seen all over the surface of the latter; which points, if wiped clean, do immediately become bloody again, being only the extremities of broken vessels. These vessels are largest at, and about the sutures, at which places the adhesion is the strongest, and the hæmorrhage upon separation the greatest.

It has been thought by many, that the dura mater was attached to the scull only at the sutures; that in all other parts it was loose and unconnected with it; and that it constantly enjoyed or performed an oscillatory kind of motion, and was alternately elevated and depressed. This idea and opinion were borrowed from the appearance which the dura mater makes in a living subject after a portion of the scull has been removed: but although it has been inculcated by writers of great eminence, yet it has no foundation in truth or nature, and has misled many practitioners in their opinions, not only of the structure and disposition of this membrane, but in their idea of its diseases.

The dura mater performs on the internal surface of the bones of the cranium, the office of periosteum, in the same manner as the pericranium does on the external; (at least they have no other:) to this it is so firmly and so generally attached, as to be incapable of any, even the smallest degree of motion. The alternate elevation and subsidence of it, which are observable when any portion of it is laid bare, are owing to a very different cause from any power in itself; neither is, nor can ever be performed, until a piece of the cranium has been forcibly taken away; and consequently cannot possibly be natural, or necessary.

By blows, falls, and other shocks, some of the larger of those vessels which carry on this communication between the dura mater and the scull are broken, and a quantity of blood is shed upon the surface of that membrane. This is one species of bloody extravasation, and indeed the only one which can be formed between the scull and dura mater. If the broken vessels be few, and the quantity of blood which is shed be small, the symptoms are generally slight, and by proper treatment disappear. When they are large, or numerous, or the quantity of extravasated fluid considerable, the symptoms are generally urgent in proportion; but whether they be slight or considerable, whether immediately alarming or

not, they are always, and uniformly, such as indicate pressure made on the brain and nerves, viz. stupidity, drowsiness, diminution or loss of sense, speech, and voluntary motion.

This every practitioner knows to be one frequent consequence of blows on the head. But it also often happens, from the same kind of violence, that some of the small vessels, which carry on the circulation between the pericranium, scull, and dura mater, are so damaged, as not to be able properly to execute that office, although there be none so broken as to cause an actual effusion of blood.

Smart and severe strokes on the middle part of the bones, at a distance from the sutures, are most frequently followed by this kind of mischief: the coats of the small vessels, which sustain the injury, inflame and become sloughy, and, in consequence of such alteration in them, the pericranium separates from the outside of that part of the bone which received the blow, and the dura mater from the inside; the latter of which membranes, soon after such inflammation, becomes sloughy also, and furnishes matter; which matter being collected between the said membrane and the cranium, and having no natural outlet whereby to escape, or be discharged, brings on a train of very terrible symptoms, and is a very frequent cause of destruction.[e] The effect of this kind of violence is frequently confined to the vessels connecting the dura mater to the cranium, in which case the matter is external to the said membrane; but it sometimes happens, that, by the force either of the stroke or of the concussion, the vessels which pass between and connect the two meninges are injured in the same manner; in which case, the matter formed in consequence of such violence is found on the surface of the brain, or between the pia and dura mater, as well as on the surface of the latter; or perhaps in all these three situations at the same time.

[e] Comment le pericrane a-t-il pû ainsi se detacher de l'os dans le circonference du coup? ne seroit ce point par l'ebranlement ou le tremoussement de toutes les parties integrantes du crane? Si c'est en consequence d'un tremoussement pareil que nombre de filets qui attachent le pericrane au crane se sont detachés, par la meme raison, plusieurs des filets qui attachent la dure mére au crane ont dû se rompre aussi: d'où s'en suivit un erysipéle, qu'occasion suppuration, ou plutot pourriture.

Le Dran.

The difference of this kind of disease, from either an extravasation of blood, or a commotion of the medullary parts of the brain, is great and obvious. All the complaints produced by extravasation are (as I have already said) such as proceed from pressure made on the brain and nerves, and obstruction to the circulation of the blood through the former; stupidity, loss of sense, and voluntary motion, laborious and obstructed pulse and respiration, &c. and (which is of importance to remark) if the effusion be at all considerable, these symptoms appear immediately, or very soon after the accident.

The symptoms attending an inflamed or sloughy state of the membranes, in consequence of external violence,[f] are very different; they are all of the febrile kind, and never, at first, imply any unnatural pressure; such are, pain in the head, restlessness, want of sleep, frequent and hard pulse, hot and dry skin, flushed countenance, inflamed eyes, nausea, vomiting, rigor; and, toward the end, convulsion and delirium. And none of these appear at first, that is, immediately after the accident; seldom until some days are past.[g]

One set or class of symptoms are produced by an extravasated fluid, making such pressure on the brain and origin of the nerves, as to impair or abolish voluntary motion and the senses; the other

[f] The difference between these two effects of external violence, was very well understood by Berengarius Carpensis, a most excellent writer on this subject, who says, "Interdum etiam a contusione non rumpitur aliqua vena, "sed rumpuntur ligamenta illa duræ matris; a quibus resudat aliquid: hisce "vero nisi succuratur, accidunt sæva accidentia, et mors."

Paulus Ægineta has also very particularly distinguished between that degree of contusion, which affects only the outer table of the scull, and that which injures the dura mater. "Porro contusionis hujus duæ existunt differentiæ: vel enim calva per totam ipsius crassitiem contunditur, ut frequenter etiam cerebri membrana abscessu occupetur; vel, &c."

[g] "Nulla autem harum contusionum aspectu dignosci potest; qualis nempe, "quantave sit. Non protinus ab ictu malum se videndum præbet."

HIPPOCRATES.

"Sed accidentia quæ sequuntur ad prædictam contusionem, *inter commis-* "*suras*, non sunt per contusionem tantum; sed sunt per *putrefactionem pan-* "*niculi læsi*, et cum venit ad certam quantitatem determinatam incipit febris, "et alia accidentia: et tandem sequitur mors, nisi cito succuratur."

JACOBUS BERENGARIUS CARPENSIS.

is caused by the inflamed or putrid state of the membranes covering the brain, and seldom affects the organs of sense, until the latter end of the disease, that is, until a considerable quantity of matter is formed, which matter must press like any other fluid.

I am very sensible that it is a generally-received opinion, that blood shed from its vessels, and remaining confined in one place, will become pus; and that the matter found on the surface of the dura mater, towards the end of these cases, was originally extravasated blood. I apprehend both these positions to be false. That pure blood shed from its vessels, by means of external violence, and kept from the air, will not turn to, or become matter, is (I think) proved incontestibly by every day's experience, in many instances, in aneurisms by puncture, in retained menses by imperforate vaginæ, and in all ecchymoses. True pus cannot be made from blood merely, as may be known from the manner in which all abscesses are formed, and from every circumstance attending suppuration; and that the matter found on the surface of the dura mater, after great contusions of the head, never was mere blood, I am as certain as observation and experience can make me.

Some of the French writers have indeed divided the symptoms of what they call a contusion of the head, into two kinds, and have named them *primitive* or *original* symptoms, and *secondary* or *consequential* ones: among the former, they rank immediate loss of sense, hæmorrhage, involuntary discharge of urine and fæces, great propensity to sleep, &c.; among the latter they reckon fever, delirium, rigor, convulsion, &c. One kind they impute to the mere extravasation of blood, the other to its putrefaction.

This account, though ingenious and specious, is not founded on fact. It is true, that the two kinds of symptoms are very distinct from each other, as well in their nature, as in their time and manner of access, and so far the remark is true; but from all the observation and examination which I have been able to make, both on the living and on the dead, they appear to me to proceed from very different causes. That both these kinds of symptoms do now and then concur in the same patient, is beyond all doubt; and that the case is thereby rendered complex, and more difficult to be judged of; but this does not constantly happen; and even when

it does, I cannot help thinking, that there are generally such distinguishing characteristic marks of each, as may prove the truth of what I have asserted.

In order to explain my meaning as clearly as I can, I will consider the inflammatory effect of contusion by itself, and independent of every other complaint or injury, which may accidentally be joined with it.

If there be neither fissure nor fracture of the scull, nor extravasation, nor commotion underneath it, and the scalp be neither considerably bruised nor wounded, the mischief is seldom discovered or attended to for some few days. The first attack is generally by pain in the part which received the blow. This pain, though beginning in that point, is soon extended all over the head, and is attended with a languor, or dejection of strength and spirits, which are soon followed by a nausea, and inclination to vomit, a vertigo or giddiness, a quick and hard pulse, and an incapacity of sleeping, at least quietly. A day or two after this attack, if no means preventative of inflammation are used, the part stricken generally swells, and becomes puffy and tender, but not painful; neither does the tumour rise to any considerable height, or spread to any great extent. If this tumid part of the scalp be now divided, the pericranium will be found of a darkish hue, and either quite detached, or very easy separable from the scull, between which and it will be found a small quantity of a dark-coloured ichor.

If the disorder has made such progress, that the pericranium is quite separated and detached from the scull, the latter will even now be found to be somewhat altered in colour from a sound healthy bone. Of this alteration it not very easy to convey an idea by words, but it is a very visible one, and what some very able writers have noticed.[h]

[h] Among these Fallopius particularly: "Inspiciatis diligenter os detectum; "quod os, quando est in natura sua, est coloris subrubri, non candidi prorsus, nec rubri prorsus, sed est veluti color mistus ex albo declinans ad rubicundum, ut si multo lacte, aut alio colore candido, poneres parum sanguinis "vel alterius rei rubræ. Sed si videritis inæqualitatem coloris in ipso osse detecto, ita ud adsint veluti puncta coloris albi, et aridi ossis, quæ aridæ particulæ aliquando majores sunt, aliquando minores, &c. sciatis quod os sit "contusum." FALLOPIUS.

From this time the symptoms generally advance more hastily and more apparently; the fever increases, the skin becomes hotter, the pulse quicker and harder, the sleep more disturbed, the anxiety and restlessness more fatiguing, and to these are generally added irregular rigors, which are not followed by any critical sweat, and which, instead of relieving the patient, add considerably to his sufferings. If the scalp has not been divided or removed, until the symptoms are thus far advanced, the alteration of the colour of the bone will be found to be more remarkable; it will be found to be whiter and more dry than a healthy one, or, as Fallopius has very justly observed, it will be found to be more like a dead bone: the sanies, or fluid, between it and the pericranium will also, in this state, be found to be more in quantity, and the said membrane will have a more livid diseased aspect.

In this state of matters, if the dura mater be denuded, it will be found to be detached from the inside of the cranium, to have lost its bright silver hue, and to be, as it were, smeared over with a kind of mucus, or with matter, but not with blood. Every hour after this period, all the symptoms are exasperated, and advance with hasty strides: the head-ach and thirst become more intense, the strength decreases, the rigors are more frequent, and at last convulsive motions, attended in some with delirium, in others with paralysis, or comatose stupidity, finish the tragedy.[i]

[i] The whole process of this very terrible disease is very accurately related and very justly accounted for, by Theodoric. "Si vero ob ictus vehementiam, "dura mater ab osse fuerit separata: vel aliquo modo læsa (sano & illæso "existente cranio) sic cognosces: cum dolor capitis, & lenta febris, singulis "diebus augmentantur, oculorum anguli, ac si spasmari vellent, distorquen- "tur; genæ rubent; (quod signum pravum est in qualibet capitis læsione;) "pannus balneatus superpositus, citius desiccatur; cutis etiam arida et sicca; "et si vulnus fuerit, et, os disco-opertum, color ossis velocius alteratur; et "propter negligentiam curæ, ægro superveniunt dolores, et febres, spasmus, "syncope, et permistio rationis."

THEODOR. *de vuln. capit.*

"Qua vero super cerebri membranam sit, utraqua ratione difficilis est: "nam læsis membranis apparet; ideo enim febris cum horrore accedunt, fa- "ciei rubor, et calor, longe major quam pro febris modo; somnique tumul- "tuosi; oculi subpingues, et gramiosi et rubentes."

ARCHIGENES *de sanguine subtercurrente.*

Petrus e Largelata, having very accurately related the symptoms attending the formation of matter under the cranium when fractured, says: "Si autem

If the scalp has not been divided or removed till this point of time, and it be done now, a very offensive discoloured kind of fluid will be found lying on the bare cranium, whose appearance will be still more unlike to the healthy natural one: if the bone be now perforated, matter will be found between it and the dura mater, generally in considerable quantity, but different in different cases and circumstances. Sometimes it will be in great abundance, and diffused over a very large part of the membrane; and sometimes the quantity will be less, and consequently the space which it occupies smaller. Sometimes it lies only on the exterior surface of the dura mater; and sometimes it is between it and the pia mater, or also even on the surface of the brain, or within the substance of it.

The primary and original cause of all this, is the stroke upon the skull: by this the vessels which should carry on the circulation between the scalp, pericranium, scull, and meninges, are injured, and no means being used to prevent the impending mischief, or such as have been made use of proving ineffectual, the necessary and mutual communication between all these parts ceases; the pericranium is detached from the scull, by means of a sanies discharged from the ruptured vessels; the bone being deprived of its due nourishment and circulation loses its healthy appearance; the dura mater (its attaching vessels being destroyed, or rendered unfit for their office) separates from the inside of the cranium, inflames, and suppurates.

Whoever will attend to the appearances which the parts concerned make in every stage of the disease, to the nature of the symptoms, the time of their access, their progress, and most frequent event, will find them all easily and fairly deducible from the one cause, which has just been assigned, viz. the contusion. As the inflammation and separation of the dura mater is not an *immediate* consequence of the violence, so neither are the symptoms immediate, seldom until some days have passed; the fever

"fractura sit parva et penetrans, tunc fiunt illa signa post aliquod tempus; "eo quod tunc humiditates quæ sunt sub cranio putrefiunt; et tunc fiunt illa "accidentia:" And then very justly adds, "Secundo notes quod omnia illa "accidentia possunt advenire ex percussione capitis, cranio non fracto."

PET. E LARGELATA.

at first is slight, but increases gradually; as the membrane becomes more and more diseased, all the febrile symptoms are heightened; the formation of matter occasions rigors, frequent and irregular, until such a quantity is collected, as brings on delirium, spasm, and death.

Hitherto I have considered this disease, as unaccompanied by any other, not even by any external mark of injury, except perhaps a trifling bruise of the scalp; let us now suppose the scalp to be wounded at the time of the accident, by whatever gave the contusion; or let us suppose, that the immediate symptoms having been alarming, a part of the scalp had been removed in order to examine the scull; in short, let the injury be considered as joined with a wounded scalp.

In this case, the wound will for some little time have the same appearance as a mere simple wound of this part, unattended with other mischief, would have; it will, like that, at first discharge a thin sanies, or gleet, and then begin to suppurate; it will digest, begin to incarn, and look perfectly well; but, after a few days, all these favourable appearances will vanish; the sore will lose its florid complexion and granulated surface; will become pale, glassy, and flabby; instead of good matter, it will discharge only a thin discoloured sanies; the lint with which it is dressed, instead of coming off easily, (as in a kindly suppurating sore,) will stick to all parts of it; and the pericranium, instead of adhering firmly to the bone, will separate from it, all round, to some distance from the edges.[k]

This alteration in the face and circumstances of the sore is produced merely by the diseased state of the parts underneath

[k] "Ubicunque autem ex vulnere intereundum sit, neque possit homo "sanitatem recipere, neque servari, ex his intelligere convenit moriturum; "et quod futurum est prognosticare. Hyeme plerumque, ante diem quar- "tum, æstate post septimum, accedit febris; quæ quum supervenit, vulnus "reddit non sui coloris, et saniem modicam effundit, quodque ex ipso inflam- "matum est emoritur, glutinosum efficitur, et carnem sale conditam repræ- "sentat."

HIPPOCRATES *de vuln. capit.*

"Ulcus neque alitur neque pus maturat, et sordidum sit."

ARCHIGENES.

the scull; which is a circumstance of great importance, in support of the doctrine advanced; and is demonstrably proved, by observing that this diseased aspect of the sore, and this spontaneous separation of the pericranium, are always confined to that part which covers the altered or injured portion of the dura mater, and do not at all affect the rest of the scalp; nay, if it has by accident been wounded in any other part, or a portion has been removed from any part where no injury has been done to the dura mater, no such separation will happen; the detachment above will always correspond to that below, and be found no where else.

The first appearance of alteration in the wound immediately succeeds the febrile attack; and as the febrile symptoms increase, the sore becomes worse and worse, that is, degenerates more and more from a healthy, kindly aspect.

Through the whole time, from the first attack of the fever, to the last and fatal period, an attentive observer will remark the gradual alteration of the colour of the bone, if it be bare. At first it will be found to be whiter, and more dry, than the natural one; and as the symptoms increase,[1] and either matter is collected, or the dura mater becomes sloughy, the bone inclines more and more to a kind of purulent hue, or whitish yellow; and it may also be worth while in this place to remark, that if the blow was on or very near to a suture, and the subject young, the said suture will often separate in such manner as to let through it a loose, painful

[1] "Tandem subpallidum vel album se ostendit; ubi autem jam purulen-
"tum est, aut pustulæ in lingua nascuntur, laborans mente non constante con-
"sumitur."

HIPPOCRATES *de vuln. capitis.*

"Quando sanies est infra cranium, *ipso non fracto*, cranium est male colo-
"ratum: æger sentit gravidinem in ea parte qua est sanies.—Est os sanum,
"id est illud cui adhæret dura mater coloris albi, misti rubedine.—Et quo
"separatio est major, eo major ossis quantitas est mutata in colore.—Ultra
"vero colorem, cognoscitur etiam eo quod siccius sit sano.—Et ultra colorem
"et siccitatem, quando incipit ista separatio, incipiunt aliqua sæva acci-
"dentia; et febris, mentis alienatio, stupor, vigilæ, &c. *Quia incipit supra*
"*panniculum aggregari materia, quæ incipit corrumpi.*"

JACOBUS BERENGARIUS CARPENSIS.

ill-natured fungus; at which time also it is no uncommon thing for the patient's head and face to be attacked with an erysipelas.[m]

I have said, that in those cases in which the scalp is very little injured by the bruise, and in which there is no wound, nor any immediately alarming symptoms or appearances, that the patient feels little or no inconvenience, and seldom makes any complaint, until some few days are past. That at the end of this uncertain time, he is generally attacked by the symptoms already recited; that these are not pressing at first, but that they soon increase to such a degree, as to baffle all our art: from whence it will appear, that when this is the case, the patient frequently suffers from what seems at first to indicate his safety, and prevents such attempts being made, and such care from being taken, as might prove preventative of mischief.

But if the integuments are so injured as to excite or claim our early regard, very useful information may from thence be collected; for whether the scalp be considerably bruised, or whether it be found necessary to divide it for the discharge of extravasated blood, or on account of worse appearances, or more urgent symptoms, the state of the pericranium may be thereby sooner and more certainly known: if in the place of such bruise, the pericranium be found spontaneously detached from the scull, having a quantity of discoloured sanies between them under the tumid part, in the manner I have already mentioned, it may be regarded as a pretty certain indication, either that the dura mater is beginning to separate in the same manner, or that if some preventative means be not immediately used, it will soon suffer; that is, it will inflame, separate from the scull, and give room for a collection of matter between them. And with regard to the wound itself, whether it was made at the time of the accident, or afterward artificially, it is the same thing; if the alteration of its appearance be as I have related, if the edges of it spontaneously quit their adhesion to the bone, and the febrile symptoms are at the same time making their attack, these circumstances will serve to convey the same information, and to prove the same thing.[n]

[m] "Suturas tempore curationis disjungi grave est."

ARCHIGINES DE SIGNIS.

[n] Si dans une playe contuse, où le crane est decouvert, on trouve à la cir-

This particular effect of contusion is frequently found to attend on fissures and undepressed fractures of the cranium, as well as on extravasations of fluid, in cases where the bone is entire; and, on the other hand, all these do often happen without the concurrence of this individual mischief. All this is matter of accident; but let the other circumstances be what they may, the spontaneous separation of the altered pericranium, in consequence of a severe blow, is almost always followed by a suppuration between the cranium and dura mater; a circumstance extremely well worth attending to in fissures and undepressed fractures of the scull, because, it is from this circumstance principally that the bad symptoms and the hazard in such cases arise.

It is no very uncommon thing for a smart blow on the head to produce some immediate bad symptoms, which after a short space of time diappear, and leave the patient perfectly well. A slight pain in the head, a little acceleration of pulse, a vertigo and sickness, sometimes immediately follow such accident, but do not continue many hours, especially if any evacuation has been used. These are not improbably owing to a slight commotion of the brain, which, having suffered no material injury thereby, soon cease. But if, after an interval of some time, the same symptoms are renewed; if the patient, having been well, becomes again feverish and restless, and that without any new cause; if he complains being languid and uneasy, sleeps disturbedly, loses his appetite, has a hot skin, a hard quick pulse, and a flushed, heated countenance; and neither irregularity of diet, nor accidental cold, has been productive of these; mischief is most certainly impending, and that most probably under the scull.

If the symptoms of pressure, such as stupidity, loss of sense, voluntary motion, &c. appear some few days after the head has suffered injury from external mischief, they do most probably imply an effusion of a fluid somewhere: this effusion may be in the substance of the brain, in its ventricles, between its membranes, or on

conference de la playe, que le pericrane tienne peu à crane, ou en soit detaché, c'est une preuve certaine que le crane a souffert, quoiqu'il ne soit fracturé; et s'il a souffert, on peut etre assuré que la dure mere a souffert aussi.

Le Dran.

the surface of the dura mater; and which of these is the real situation of such extravasation, is a matter of great uncertainty, none of them being attended with any peculiar mark or sign that can be depended upon as pointing it out precisely; but the inflammation of the dura mater, and the formation of matter between it and the scull, in consequence of contusion, is generally indicated and preceded by one which I have hardly ever known to fail, I mean a puffy, circumscribed, indolent tumor of the scalp, and a spontaneous separation of the pericranium from the scull under such tumor.[o]

These appearances, therefore, following a smart blow on the head, and attended with languor, pain, restlessness, watching, quick pulse, head-ach, and slight irregular shiverings, do almost infallibly indicate an inflamed dura mater, and pus either forming or formed between it and the cranium.[p]

By detachment of the pericranium, I do not mean every separation of it from the bone which it should cover. It may be, and often is cut, torn, or scraped off, without any such consequence; but these separations are violent, whereas that which I mean is spontaneous, and is produced by the destruction of those vessels by which it was connected with the scull, and by which the communication between it and the internal parts was carried on; and

[o] Lorsqu'on trouve le pericrane detaché, il n'y a point à hesiter à faire le trepan. Je sçais que dans un cas pareil on n'auroit rien trouvé d'epanché sous le crane, mais cependant l'operation faite de bonne heure auroit été l'unique moyen de sauver le malade s'il etoit possible, &c.

Si donc plusieurs experiences nous apprennent que la dure mere devient malade en consequence de la contusion de l'os, et que sa maladie degenere en pourriture, ce qui a jusqu'ici emporté plusieurs malades malgré de recours usités, il faut absolument trepanner de bonne heure.

Le Dran.

[p] Si statim ab initio febris primo aut secundo appareat die, illa procul dubio causam agnoscat perturbationem humorum, ac animi, quum vulnus incuteretur; cessante causa procatarctica; ac ubi se collegerit æger, desinat illa febricula. Si vero primis diebus, nihil febrile, nec ullum symptoma sentiat æger, seque in nullo discrimine existimat, hunc si subito, die scilicet septimo, vel quarto decimo (nihil licet in victu, rebusve externis peccaverit æger) ac præter expectationem febris invadat, significat latens aliquod, in cranio, cerebro, aut corpore vulnerati.

Pet. Paaw. in Hippocrat.

therefore it is to be observed, that it is not the mere removal of that membrane which causes the bad symptoms, but it is the inflammation of the dura mater, of which inflammation this spontaneous secession of the pericranium is an almost certain indication.

A false notion prevailed for many years, that the dura mater was not in general connected with the internal surface of the scull, except at the sutures; and that in all other parts of it, such a vacancy was left as gave free room for what they called its pulsatory motion.[q] This opinion, which was embraced by many, even of the

[q] If we consider how clearly and plainly many of the best ancient writers describe the intimate connexion between the scull and dura mater, and how perfectly well acquainted many of them were with its morbid separation, we shall wonder how it came to be again forgot; but that it was, is most certain. In Hippocrates, Paulus Ægineta, Rhazes, and others, are many passages which prove their knowledge of the natural structure and adhesion of this membrane; and that some of the most eminent writers and practitioners had forgot, or did not attend to it, the following quotations, selected from many more, may evince.

"Dura mater calvariæ connectitur futurarum ope ut pensile et erectum "teneat cerebrum; tum etiam ut per suturas egressa pericranium procreat: "spatium vero inter suturas recte natura liberum reliquit ut vacuum quod-"dam esset inter duram matrem et calvariam; has nimirum ob causas; primo "ne quicquam cerebri systolæ et diastolæ obstaret; secundo ne venæ, et ar-"teriæ per externam duræ matris partem sparsæ levi aliquo ictu in cranio "facto rumperentur; postremo ut ruptis in dura matre venis, sanguis non "inter duram et piam matrem, sed inter duram et cranium effunderetur, et "cranio perforato facilius extraheretur. Et hic est ordinarius naturæ ordo."

GUL. FAB. HILD.

Felix Wirtz says, that the elevation of the cranium in slight impressions is needless. "Id enim motum cerebri, propter *vacuum* et distantiam quæ est "inter meningem et cranium, minime impedire." And Hildanus, by way of reproof to what Felix Wirtz says: "Aliquando duram matrem cranio undique "adhærere vidimus."

Fallopius, speaking of the dura mater, says: "Continuo pulsat, quare non "facile sanatur."

Petruse Marchetti supposed the dura mater always to be at a distance from the scull in those who were bald. Speaking of the treatment of a particular case, he says: "Post septimam nempe oleum hyperici, quia calvus erat pa-"tiens atque membrana a calvaria distabat; quod in calvis semper observavi."

PET. E MARCHETTI *Obs. Chir.*

"Aliquando contingit ut dura mater cranio satis firmiter adhæreat, sed hæc "*admodum raro evenire solet, atque præter naturæ* consuetudinem est."

MUYS *Prax. Rat. Chirurg.*

most eminent practitioners, was the principal reason why the bad effects of contusions of the head were so little understood, and so grossly mistreated by them. They supposed that the vacuity between the dura mater and cranium was sufficient, in general, to defend the former from all external violence; and the blood and matter so often found between them were thought to be deposited in a space naturally vacant. Upon this principle stood both their opinion and practice; and therefore it is not to be wondered at, that their accounts, in general, are so perplexed, and so seldom verified by the examination of dead subjects.

It sometimes happens, that the scalp is so wounded at the time of the accident, or so torn away, as to leave the bone perfectly bare; and yet the violence has not been such as to produce the evil I am now speaking of. In this case, if the pericranium be only turned back, along with the detached portion of scalp, there may be probability of its reunion, and it should therefore be immediately made clean and replaced for the purpose of such experiment, which, if it succeed, will save much time, and prevent considerable deformity. If this attempt do not succeed, the detached piece may be removed, and the case then becomes as if the scalp and the pericranium had been forced away at the time that the wound was first inflicted; and the worst that can happen, will be an exfoliation from the bare scull.[r]

This was also the opinion of Sylvius, Pacchioni, Ambrose Paré, Serjeant Wiseman, Baglivi, Barbette, and of all those who maintained the doctrine of the oscillation of the dura mater, and who believed that that membrane was found sometimes higher, sometimes lower, that is, sometimes nearer to, sometimes farther from the scull, at one age, and at one time of the moon, than another.

[r] Not that exfoliation is the necessary consequence of the scull being laid bare: this depends upon other circumstances, besides the mere removal of the scalp and pericranium. The solidity of the surface of the bones, the size of the vessels, and the impulse of the blood through them, are what principally determine that. If the cortex of the bone be not very hard, and the impulse of the blood be capable of counterbalancing the effects of the external air, a granulation of flesh will be generated on the surface of the bone, which will cover and firmly adhere to it, without throwing off the smallest exfoliation, especially in young subjects. On the contrary, if the bone be much hardened, and the vessels thereby constringed; or if such applications be made use of, as will produce an artificial constriction of them, the surface

It does also sometimes happen, that the force which detaches or removes the scalp, does also occasion the mischief in question; but the integument being wounded, or removed, we cannot have the criterion of the tumour of the scalp, for the direction of our judgment. In these circumstances, our whole attention must (as I have already said) be directed to the wound and general symptoms: the edges of the former will (as I have already observed) digest as well, and look as kindly, for a few days, as if no mischief was done underneath; but, after some little space of time, when the patient begins to be restless, and hot, and to complain of pain in the head, these edges will lose their vermilion hue, and become pale and flabby; instead of matter they will discharge a thin gleet, and the pericranium will loosen from the scull to some distance from the said edges: immediately after this, all the general symptoms are increased and exasperated; and, as the inflammation of the membrane is heightened, or extended, they become daily worse and worse, until a quantity of matter is formed, and collected, and brings on that fatal period, which, though uncertain as to date, very seldom fails to arrive.

The method of attempting the relief of this kind of injury consists in two points, viz. to endeavour to prevent the inflammation of the dura mater; or, that being neglected, or found impracticable, to give discharge to the fluid collected within the cranium, in consequence of such inflammation.

Of all the remedies in the power of art, for inflammations of membranous parts, there is none equal to phlebotomy. To this truth many diseases bear testimony; pleurisies, ophthalmies, strangulated hernias, &c.: and if any thing can particularly contribute to the prevention of the ills likely to follow severe contusions of the head, it is this kind of evacuation; but then it must be made use of in such a manner as to become truly a preventative, that is, it must be made use of immediately, and freely.

I am very sensible, that it will in general be found very difficult to persuade a person, who has had what may be called only a

will necessarily become dry, and the juices ceasing to circulate through it, it must part with a scale to a certain depth; that is, that part of the surface through which the circulation ceases to be carried on will be separated from, and cast off by the vessels which nourish the rest of the bone.

knock on the pate, to submit to such discipline, especially if he find himself tolerably well. He will be inclined to think, that the surgeon is either unnecessarily apprehensive, or guilty of a much worse fault; and yet, in many instances, the timely use or the neglect of this single remedy, makes all the difference between safety and fatality.

It may be said, that as the force of the blow, the height of the fall, the weight of the instrument, &c., can never precisely or certainly determine the effect, nor inform us whether mischief be done under the bone or not, a large quantity of blood may be drawn off unnecessarily, in order to prevent an imaginary evil. This is in some degree true; and if the advice which I have just given were universally followed, many people would be largely bled without necessity; but then, on the other hand, many a very valuable life would be preserved, which, for want of this kind of assistance, is lost. "Nihil interest, præsidium an satis tutum sit, "quod unicum est," is an incontested maxim in medicine; and if it be allowed to use such means as may be in themselves hazardous, surely it cannot be wrong to employ one which is not so; at least, if it be considered in a general sense, whatever it may accidentally prove to some few particular individuals.

Acceleration, or hardness of pulse, restlessness, anxiety, and any degree of fever, after a smart blow on the head, are always to be suspected and attended to. Immediate, plentiful, and repeated evacuation by bleeding, have, in many instances, removed these, in persons to whom, I do verily believe, very terrible mischief would have happened, had not such precaution been used. In this, as well as some other parts of practice, we neither have, nor can have any other method of judging, than by comparing together cases apparently similar. I have more than once or twice seen that increased velocity and hardness of pulse, and that oppressive languor, which most frequently precede mischief under the bone, removed by free and repeated blood-letting; and have often, much too often, seen cases end fatally, whose beginnings were full as slight, but in which such evacuation had been either neglected or not complied with.

I would by no means be thought to infer from hence, that early bleeding will always prove a certain preservative, and that they

only die to whom it has not been applied: this, like all other human means, is fallible; and perhaps there are more cases out of its reach, than within it; but, where preventative means can take place, this is certainly the best, and the most frequently successful.

The second intention, viz. for procuring the discharge of matter collected under the cranium, can be answered only by the perforation of it.

When, from the symptoms and appearances already described, there is just reason for supposing matter to be formed under the scull, the operation of perforation cannot be performed too soon; it seldom happens that it is done soon enough.[s]

The propriety or impropriety of applying the trephine, in cases where there is neither fissure, fracture, nor symptom of extravasation, is a point which has been much litigated, and remains still unsettled either by writers or practitioners.

When there is no reason for suspecting any of those injuries, either from the symptoms, or from the appearances; and the pericranium, whether the scalp be wounded or not, remains firmly attached in all parts to the scull; there certainly is not (let the general symptoms be what they may) any indication where to apply the instrument, and consequently no sufficient authority for using it at all: but whenever that membrane, after the head has received an external violence, separates, or is detached spontaneously from the bone underneath it, and such separation is attended with the collection of a small quantity of thin, brown ichor, an alteration of colour in the separated pericranium, and an unnatural dryness of the bone, I cannot help thinking, that there is as good reason for trepanning, as in the case of fracture; I believe experience would vindicate me, if I said, better reason; since it is by no means infrequent for the former kind of case to do well without such operation, whereas the latter (I mean suppuration under the scull) never can.[t]

[s] "His, ubi cito manus admoveatur, salutis aliqua spes subest; ubi serius, "plerique omnes moriuntur."

ARCHIGENES.

[t] Les auteurs jusqu'ici ne nous ont parlé du trepan qu'autant qu'il pouvoit servir à relever des pieces du crane enfoncées par un coup violent, ou a

All the best practitioners have always agreed in acknowledging the necessity of perforating the scull in case of a severe stroke made on it by gun-shot, upon the appearance of any threatening symptoms, even though the bone should not be broken; and very good practice it is. A wound by gun-shot (as far as it relates to the scull) is to be regarded only as one attended with a very high degree of contusion, and therefore most likely to produce symptoms accordingly; among which, inflammation of the dura mater stands principal. Experience confirms both; most of the symptoms attending wounds of the head, made by gun-shot, are symptoms of contusion; and the formation of matter between the cranium and dura mater is a very frequent and a very fatal consequence of such contusion.

In short, the spontaneous separation of the pericranium, if attended with general disorder of the patient, with chilness, horripilatio, languor, and some degree of fever, appears to me, from all the observation I have been capable of making, to be so sure and certain an indication of mischief underneath, either in present, or impending, that I should never hesitate about perforating the bone in such circumstances.

When the scull has been once perforated, and the dura mater thereby laid bare, the state of the latter must principally determine the surgeon's future conduct. In some cases, one opening will prove sufficient for all necessary purposes, in others several may be necessary. This variation will depend on the space of detached dura mater, and the quantity of collected matter. The repetition of the operation is warranted, both by the nature of the case, and by the best authorities; there being no comparison to be made between the possible inconvenience arising from largely denuding the dura mater, and the certain as well as terrible evils which must follow the formation and confinement of matter between it and the scull.

donné issue à quelque liqueur, comme seroit du sang, ou du pus, epanché, sous le crane.

La contusion de l'os est un cas, où le trepan n'est pas moins necessaire; non à cause que l'os est contus, mais pour prevenir la maladie de la dure mére, et de la pie mére; qui en est une suite presque indispensable.

Le Dran.

It can hardly be necessary for me to observe, to whoever reflects ever so little on the true nature of these cases, that notwithstanding the operation of perforation be absolutely and unavoidably necessary, yet the repetition of blood-letting, of cooling laxative medicines, the use of antiphlogistic remedies, and a most strict observance of a low diet and regimen, are as indispensably requisite after such operation as before; the perforation sets the membrane free from pressure, and gives vent to collected matter, but nothing more; the inflamed state of the parts under the scull, and all the necessary consequences of such inflammation, call for all our attention, full as much afterwards as before; and although the patient must have perished without the use of the trephine, yet the merely having used it will not preserve him, without every other caution and care.

This being all that our art is capable of doing in these melancholy cases, I wish I could say, that it was most frequently successful. Sometimes it is: the operation, considered abstractedly, is not in itself hazardous, and is the *unicum remedium* for the most immediately impending and most threatening mischief: some have been saved by it, none can escape without it. As there are no certain indications, no *criteria*, whereby we are enabled to judge whether it will prove successful or not, the event of each individual case can alone determine. When that is happy, the means are very justly commended; but when it is not so, they ought not therefore to be condemned; since they are built on rational principles, and are the only means in human power.

CASE I.

A poor fellow crossing Tower-hill, got, before he was aware of it, into a mob, that was endeavouring to rescue a sailor from a press-gang. The man was knocked down. When the crowd dispersed, he was found senseless, and in that state was brought to St. Bartholomew's hospital, where he was immediately let blood, and put to bed. In an hour or two, he was so recovered, as to be able to give the preceding account.

When Mr. Nourse (whose week it was for accidents) saw him

the next day, the man appeared to be perfectly well, nor did any mark of violence appear on his head, except one small bruise, and that so slight, that it might, with more probability, be attributed to the fall than the blow. However, as he was positive that he had been knocked down, by a very smart blow, from a heavy weapon; and as he certainly had been deprived of sense a considerable time thereby; Mr. Nourse bled him again, and ordered him to be kept in bed, and to a very low diet. At the end of three days the man found himself so well, as to leave the hospital, and go to work. On the twelfth day from that of the accident, he came to my surgery, and complained of being much out of order; said that his head was very uneasy; that he was hot, thirsty, got little or no sleep, and was at times so faint that he could not pursue his labour. He looked ill, assured me he had lived very soberly from the time of his leaving the hospital, and that he had been in his present state for three days past. I took him into the house again, bled him, ordered him a clyster immediately, and that he should be kept in bed.

Next day (13th) he was in much the same state as the preceding; he had passed a restless night, had dosed now and then, but awoke with much disturbance. He had a hot skin, and a flushed countenance, mixed with a light yellow tint; he complained of general pain and tightness all over his head, but neither to the sight nor to the touch was there any appearance, or sensation, whereon to build a probable supposition of particular mischief. He was again, by the physician's order, let blood, and directed to take the sal absinthii mixture, with a few grains of rhubarb in it, every six hours. He passed the ensuing night in a disturbed manner, and the next day (the 14th) was apparently worse; his skin was hotter, his pulse quicker, and his pain more acute; he also now thought, that one part of his head was tender to the touch, and said, he was sure that was the part that received the blow. This place I examined. The scalp did seem to be rather fuller than natural, but by no means sufficiently so to enable me to form any judgment by. Toward the close of this day he had a slight shivering, was sick, and vomited, and passed the following night without any sleep at all; talking sometimes incoherently, but still capable of giving a rational answer to any question which

engaged his attention. On the 15th day, the tumor of the scalp was more apparent, but yet seemed to contain little or no fluid, and was about the breadth of a crown piece. I would have removed that portion of scalp; but while I was intending it, the poor man had a very severe rigor, which disordered him so much, that he begged to be let alone for the present. That afternoon he had two more shiverings, passed very ill the following night, and next morning was delirious. The tumor now was more risen, contained palpably a fluid, but was by no means tense; I took away the whole tumid piece, by a circular incision, gave discharge to a thin brown sanies, and found the cranium perfectly naked, altered considerably in colour from that of a healthy natural one, but without fissure, fracture, or other evil. That whole night and next day he was delirious; his skin burning hot; he had frequent spasms, which shook his whole frame, and the next night (the 17th) he died.

The whole scalp, except round the edge of the incision, was in a natural state; the pericranium in every other part, except the tumid one, adhered to the bone; and neither inflammation, nor tumor of any kind, all over the rest of the head. Under that part of the scull from which the pericranium had been detached, and from which the scalp had been removed, a very considerable collection of matter was found lying between the dura mater and cranium, but no appearance of disease any where else.

CASE II.

CONTUSION WITH WOUND.

A young fellow, playing at quoits, was struck down by the perpendicular fall of one of them on his head. It made a large wound, which bled freely, but did not divide the pericranium, and consequently did not denude the scull. The wound was brought together by a stitch made by somebody at hand; and the man, though stunned at first by the blow, having vomited plentifully, was soon well, and the next day went to his work, which was that of a farrier. The wound was dressed daily with a su-

perficial pledget, by the person who first saw and stitched it; and it seemed to unite kindly.

On the sixth day from that of the accident, he complained of being chilly and faint; and when he had done about half a day's work, found himself unable to bear the heat of the forge, or to stoop to shoe a horse, on account of pain in his head; he therefore left his shop, went home, and sent for the apothecary who first had dressed him. The wound, not being very carefully examined, appeared to be healed, and therefore was not regarded as any cause of the man's present indisposition, who was treated as having a fever from cold and irregularity: he was let blood, and took some medicines; but at the end of three days (nine from the accident) being worse, and incapable of bearing the expense of remaining at home, he was brought to St. Bartholomew's hospital. On the tenth day from that on which he was wounded, I saw him. He had a considerable degree of fever; his pulse was hard and quick, his skin hot and dry, his face flushed, his eye languid, and he complained of great pain and tightness all over his head. The wound was apparently but not really healed; I could pass a probe underneath, from one end to the other of it; and I could feel the cranium bare the whole way. I divided its whole length; found the pericranium sloughy, and detached to a considerable distance, and the bone much altered in colour; upon sight of which, I removed the whole separated part, by a large circular incision.

From the symptoms and appearances I prognosticated no good. He was again let blood, and had a clyster, and a lenient purge, which together produced three stools. That night (the 10th) he had a rigor, after which his pain became more intense, and fever higher.

The next morning (the 11th) he had another shivering; and when I saw him about noon, he was very inconsistent. I set on a trephine close to the sagittal suture on one side; and gave discharge to a small quantity of matter which lay on the surface of the dura mater; after being lightly dressed, some more blood was drawn from one of the jugular veins, and he was ordered to take a draught of the salt of wormwood mixture frequently. The next day (the 12th) he was worse. I therefore set the trephine on

again, but on the other side of the suture, and by that means let out a considerable quantity of matter from between the scull and membrane. Soon after this he became more rational, and seemed to get a little sleep; but in the evening his pain returned with great violence, and he had a rigor which held him above an hour.

When I saw him the next day (the 13th) he was senseless, had a low faltering pulse, and a profuse cold sweat; soon after which he expired.

Upon removing the upper part of the scull, a large quantity of matter was found under each parietal bone, which had detached the dura mater from its connexion with the scull for a considerable space, but not at the suture. On the right side a portion of the dura mater was become sloughy, about the breadth of a shilling; and under this altered part was matter between the two meninges.

The more firm attachment of the dura mater at the sutures, renders the separation of it at these places very difficult: which circumstance, added to the consideration of the situation of the sagittal suture on the very top of the head, renders the application of the trephine on each side of it often absolutely necessary. For if there be good reason to suspect either an extravasation of blood, or a collection of matter in consequence of a blow received on this suture, and one side only be perforated, the operation may happen to be performed on that side where the blood or matter does not lie, and will therefore be successless: or, on the other hand, the extravasation or suppuration may be on both sides; and then the perforation of one only cannot answer the whole purpose, and the patient will as certainly perish as if nothing had been done at all.

CASE III.

CONTUSION WITHOUT WOUND.

A BOY about nine years old, playing under an empty cart, whose shafts were supported by a stick, was knocked down by the fall of one of them upon his head. The child was stunned by the

blow for a minute or two, but soon became sensible. When he came home, there being a small swelling where the blow had been stricken, his mother applied a bit of linen rag, wet with vinegar; and as he appeared to be perfectly well, in a day or two he was sent to school.

Five days passed over before he made any complaint: on the sixth, he said that his head ached; he brought up his breakfast, and could eat no dinner; but in the evening seemed to be pretty well again. On the 7th he complained still more of his head, and said that he was very sick and very cold. He was put to bed, but got no rest. As he had not had either small-pox or measles, he was brought home, and treated as if one of these diseases was to follow.

Three days more passed, and no eruption appeared: the fever continued much the same; he was frequently inclined to vomit; and what little sleep he got, was extremely disturbed. He was, by the order of a physician, let blood, had a blister applied to his back, and took some of the common febrifuge medicines. On the 12th day from that of the accident, he was seized with a shivering, which held him more than a quarter of an hour; after which his pain became more acute and his fever higher. Some blood was drawn from his temples by leeches, and he was ordered some other medicines. On the 13th at noon, he had another rigor, still more severe than the former, and of longer duration; and that evening he became light-headed. By some means or other, the accident of the blow was now mentioned to the person who attended him, and who desired that a surgeon might look at his head. I found about a third part of the left parietal bone covered by a flattish tumor, containing a fluid.

From the appearance of this swelling, from the date of the accident, the attack, violence, and duration of the symptoms, I made no scruple to give my opinion, that the blow had been the sole cause of all the child's illness; that I suspected the scull under the tumor to be bare, if not injured; that I did also believe, that matter was forming, or formed, under the scull; and that if the last conjecture was true, the only chance the child could have of preservation, must be from the operation of the trephine.

The scalp was divided, and the scull found as I suspected, that

is, perfectly bare, and altered from a natural colour: I would therefore have perforated it immediately; but, as the bone was not broken, the parents objected to such operation; and the physical gentleman, who had the care of the boy, not having seen much business of this kind, and not rightly comprehending the true nature of the case, joined in opinion with the parents, that such operation was not necessary. It was therefore not performed, and the whole was committed to internal remedies.

The fever increased, and the child's strength decreased in proportion: he continued delirious for three days more, then sank into a state of insensibility, and died.

Having been contradicted, and (as I thought) somewhat improperly over-ruled in the management of the patient while alive, I was the more importunate to get leave to examine him when dead.

All that part of the dura mater which had been covered by the left parietal, and part of the temporal bone, was detached from the said bones, and covered with a considerable quantity of matter. Under the middle part of the former bone the dura mater was discoloured and sloughy; this discoloured part I opened with a lancet, and let out near a spoonful of matter, which matter lay between the meninges. All the rest of the contents of the head were unaffected.

When first I saw this child, all chance of relief from evacuation was over, and his symptoms plainly indicated mischief under the scull. Nothing, therefore, but perforation could give him any kind of chance.

I do not say that this operation would have saved him; I am much inclined to believe that it would not; but still it was the only thing that could with propriety have been done for him; and therefore it ought to have been done, instead of wasting time with the use of internal remedies, from which no possible good could be expected or derived.

CASE IV.

CONTUSION WITHOUT WOUND.

A LABOURING man fell from a scaffold, two stories high, by which he was for a few minutes stunned and insensible, but soon recovered. He was let blood; and, having bruised his right arm, and the same side of his forehead, he was properly dressed by somebody in the neighbourhood.

Next day, being very well, he returned to his labour, and followed it daily for five more. On the sixth, finding himself a good deal out of order, he came to the hospital for advice. He complained of shooting and frequent pain in his head; of giddiness, and inclination to vomit; and said, that he felt as if a cord was drawn tight round his brain. On the right side of his forehead was a small tumor, neither tense nor painful, but palpably containing a fluid. I persuaded the man to let me open it. I found a small quantity of a brown fluid, covering the bone, perfectly denuded of its periosteum; upon which discovery, I removed the whole piece by a circular incision: fourteen ounces of blood were drawn from his arm; a clyster was thrown up, and he was confined to his bed, and barley-water.

Next morning (the seventh) his pulse was full, hard, and frequent; he had slept very little, and that in a very disturbed manner. He was, by the physician's order, let blood again, and directed to take the sal absinthii mixture, with rhubarb sextis horis. On the eighth day, he was let blood again from one of the jugulars, and being rather still costive, took a gentle purge. On the ninth, his pulse was still higher and harder, and his skin more hot and dry; twelve ounces more of blood were drawn off from one of the temporal arteries. That evening he had a shivering, after which he complained that his pains were much increased. Next morning (the tenth) his sore looked very ill: was pale, spongy, and glassy, and the scalp separated from the scull to some distance beyond the edges of the wound. I set on a trephine, and removed a piece of the cranium, under which the dura mater was smeared over

with matter, and had lost its bright colour. That night he got no sleep, and toward morning had another rigor.

The eleventh, at noon, he was manifestly worse in every respect; his pain was intense, his fever high, and his sore as ill-conditioned as possible. With the largest trephine I had, I took away another piece of the cranium, nearer to the temporal bone, and, by means of this opening, procured the discharge of a considerable quantity of matter. This done, finding his pulse still high and full, I drew off ten ounces more of blood, and ordered him a clyster. The loss of blood produced a swooning, which lasted some minutes, after which, he said that he thought his head was rather easier. As the evening approached, his pain returned, wherefore some leeches were applied to his temples. That night he got a little quiet sleep, and in the morning of the twelfth day said that his head was perfectly easy: a very large discharge of matter had been made through the perforation in the cranium, and I thought that the wound of the scalp wore rather a better aspect. He was kept strictly to a proper low regimen; took at first the sal absinthii mixture freely; when his pain had left him, the physician ordered him the bark; and, in a very few days, every bad symptom and appearance left him.

Would not this case, which ended so happily, have been attended with the most fatal consequences, if the free perforation of the scull had been omitted, or if less blood had been drawn off?

CASE V.

CONTUSION WITH WOUND.

A YOUNG fellow of about twenty years was thrown from an unruly horse against one of the rails in Smithfield. The blow was great; he lay senseless for above an hour, and in that state was brought into St. Bartholomew's hospital.

He had a large wound on one side of his forehead, the skin of which which was partly torn quite off, and partly turned down

over his eye. The lips of the wound were, by the person who saw him first, brought as near together as they would admit, but such a portion was lost, as necessarily left the bone bare about the breadth of a shilling. As soon as his wound had been examined, he was let blood and put to bed. The next day, his pulse being hard and full, he was again let blood, and was ordered to have a clyster, a lenient purge, and some febrifuge medicines. On the third, the wounded scalp, and that side of the face being much swollen, a warm cataplasm was applied over the dressings, and the part was well fomented; and, in about five days more, every thing wore so good an aspect, that the man seemed to be getting well apace. On the ninth, he complained of being out of order, said his head ached, and that he had not slept the preceding night. He was hot and feverish, and his pulse hard and full. He was therefore let blood again, and ordered to have a clyster, and to be kept very low. On the tenth, in the night, he had (as he called it) a chilliness which *came* all over him; after which his pain was considerably increased. On the eleventh, his sore seemed to spread, discharged a thin gleet instead of matter, the lint with which it was dressed stuck fast to all parts of it; and its surface, from having been florid and granulated, became tawny and spongy. That day he had another shivering; and, on the next, being the twelfth, a consultation was held on him. He was now very hot and feverish; his face much flushed, an erysipelas beginning to appear on his eye-lids, his sore very ill-conditioned, and the bare bone so much changed from its natural colour, that it looked as if matter might have been seen through it. Consideratis considerandis, it was agreed that he had no chance for his life but by perforation of the bare cranium. The operation was immediately performed, and a quantity of matter found on the dura mater. For several days the discharge was great, and the man continued very ill; but about the eighteenth day the fever left him, he became easy, the discharge lessened, his sore put on a good face, and he got a natural sleep. From this time nothing sinister happened, and the man got soon well.

CASE VI.

CONTUSION WITHOUT WOUND.

A LAD about twelve years old, standing by a man who was playing at cricket, received a blow from the bat on his forehead. The boy became senseless, and as he was not known to any body present, he was brought to the hospital. He recovered his senses before he got thither; but the part which received the stroke being much swollen, he was dressed, let blood, and ordered to keep in bed. When I saw him next morning, he had no complaint but the soreness of his forehead, under the skin of which there seemed to be a good deal of extravasated, coagulated blood. His pulse was full and strong; he was therefore again let blood; and as he had not had a stool for two days, a clyster was thrown up, and a lenient purge given. A discutient cerate was kept upon his forehead; and, being of a costive habit, he was purged once in two or three days; and, on the ninth from that of the accident, was discharged from the house. On the fourteenth, he returned to it again, complained of lassitude, giddiness, and head-ach. He was put under the care of the physician, was let blood, vomited, purged, and took proper medicines, but remained much the same for three or four days; that is, he was feverish, with a skin too hot, a pulse too quick, and what little sleep he got was unquiet and short. On the seventeenth day he had a slight rigor, during and after which his pain in the head was much more intense; and the following day all his febrile symptoms were much exasperated. On the nineteenth, he complained of tenderness to the touch on his forehead, and great general pain in his head. He was again let blood, and was more sunk by the discharge than I could have supposed, but no remission of his symptoms followed. His sleep that night was very little, and very unquiet; toward morning he had two distinct shiverings; and when I saw him at noon, on the twentieth, his forehead appeared somewhat tumid and puffy. From the continuance and exasperation of his symptoms, and from the new appearance on his forehead, I was almost certain there was mischief

on or under the scull; I therefore divided the scalp, to examine the bone, and found, between it and the pericranium, which had quitted its adhesion for more than the breadth of a crown piece, a small quantity of a thin, discoloured fluid.

This (as it appeared to me) put the nature of the case out of doubt, and left the boy no chance, but from perforation. I therefore applied the trephine immediately, and gave discharge to matter formed between the dura mater and bone. For a week after the operation, the discharge was large, and the boy in much hazard; but, at the end of that time, the suppuration lessened, the dura mater incarned kindly, and by proper care, and taking freely of the decoct. cortic. Peruv. he got well.

CASE VII.

CONTUSION WITHOUT WOUND.

A MAN in the neighbourhood of St. Giles's had a quarrel with his wife; in which he struck her over the head with a mop-stick. The blow was a smart one, but as it neither fetched blood, nor brought her to the ground, it only finished the dispute, and no farther notice was taken of it. The woman followed her business, which was that of crying greens about the streets, and lived (to use her own words) sometimes drunk, sometimes sober, for a week. On the eighth day from that of the blow, she found herself so ill, that she applied to the hospital for admission; and was taken in as a physician's patient for a fever. The doctor wrote for her; and the day after this (the tenth from the accident) the sister of the ward, in cutting off the patient's hair, which was full of vermin, discovered a swelling, which she desired me to look at: it was flattish, about the breadth of the palm of a hand, and lay immediately across the sagittal suture. The woman had now a hard full pulse, a hot dry skin, a black tongue, a frequent inclination to vomit, great thirst, intense pain in her head, and got no sleep. From these symptoms and appearances, and from the account which the woman now first gave of the blow, I made no hesitation to say, such blow was the cause of all her symptoms.

That night she had a severe rigor, and the next day, the eleventh, an erysipelas had taken possession of part of her visage. I opened the tumor, and finding the bone bare, cleared away the scalp largely, and circularly. I then applied a trephine on one side of the suture and close to it, and found the dura mater altered in its natural colour, and, as it were, smeared over with matter. She passed the succeeding night very ill, was in great pain, got no sleep, and had two shiverings. When I came to her the next day, her whole visage was covered with an erysipelas, and so swollen, that she could not open her eyelids. I applied the trephine on the other side of the suture, and found the same appearance, viz. matter on the surface of the membrane. She had within the last two days been let blood three times, and had constantly taken such medicines as the physician had ordered for her, and which were calculated to abate her fever, and keep her body open. Her symptoms still continued without abatement, the wound of the scalp bore as bad an aspect as possible, she talked very inconsistently, got not a wink of sleep, and called perpetually for drink. As the quantity of bone made bare by the removal of the scalp gave room for the farther application of the instrument, I made a third perforation near to the first, and immediately gave thereby discharge to so large a quantity of matter, as to satisfy me the event must be fatal.

The next day the right arm and leg became paralytic; and the day following that, from having been raving, she sunk into a state of perfect insensibility, had a short, laborious respiration, a small, interrupted, faltering pulse, and cold extremities, and on the sixteenth day from that of the accident she died.

Upon opening the head, the dura mater was found covered with matter, under the whole internal surface of both the parietal bones; but the firm adhesion of the longitudinal sinus to the sagittal suture had prevented all communication between the two collections of matter.

CASE VIII.

CONTUSION WITH WOUND.

A LUNATIC threw himself from a window, two stories high, and in his fall struck his head, first against a sign-iron and then against a slated pent-house.

He was taken up senseless, with three wounds on his head; one just above the right temple, and two on the top of his head: the wounds were but small, nor was the pericranium divided in any of them. He remained stupid above twelve hours; but being in that space of time let blood freely twice, he recovered his senses, but shewed no signs of a right understanding. He passed two days and nights in the utmost disorder and disturbance. He was confined in a strait waistcoat, and kept two people constantly employed in holding him: at last, by repeated phlebotomy, and taking a large quantity of opium, he fell asleep, slept near twelve hours, and then awoke perfectly tranquil, and perfectly rational. By the sixth day from that of the fall, his wounds were in perfect good order, and seemed to heal without any trouble; the man was in very good health and temper, and perfectly rational and intelligent. He would have been permitted by his friends to have gone out a little way into the country; but lest there should be any latent mischief, I advised him to keep quiet a little longer, and to live with great caution; which advice was followed. On the tenth day from that of the accident, he lost his appetite, looked dull and languid, refused food and company, complained that his head ached, and said that he had not slept. So little time had passed since he had been disordered in his mind, that from his aspect and manner I suspected a return of his lunacy. I let him blood again, directed that he might be kept low, and desired his brother, who was an apothecary, to give him an opiate at going to bed. The next day, the eleventh, he said that his head-ach had again prevented him from sleeping all night, and that he felt as if a cord was bound tight about his brain: his skin was too hot, his pulse was too hard and too frequent; his urine small in quantity, and

high coloured; and the aspect of the wounds in the scalp by no means so favourable as they had hitherto been: one of them looked more spongy and pale than the others. I examined with my probe, and found the scull bare for some space under it. With his own and brother's consent, I removed all the scalp covering the bare cranium, and found it to be considerably altered from a natural colour. I bled him again, and desired that he might take freely of the salt of wormwood and lemon-juice until the next day. That night he had a smart rigor, and the next morning, finding him worse and more disturbed, I made a perforation of the scull. The dura mater under this perforation was dull, and had apparently matter on its surface, though small in quantity. He was dressed lightly; and, as his pulse would very well bear it, eight ounces more of blood were drawn off. The following morning, the thirteenth, he had a still more severe shivering, his pain in his head was greater, his fever higher, and the whole sore so crude, that the lint was with difficulty removed from it. I applied the trephine again, and found the same appearance, viz. a dull discoloured dura mater, and a small quantity of matter. That evening he had another rigor, and was the following day manifestly worse. Convinced, from the symptoms, of his hazard, and firmly believing that matter was collected in such manner as not to be discharged by the two openings already made, I ventured to make a third, and that a large one; which produced an immediate and large discharge of pus. In seven or eight hours I saw him again, and found him easier and more tranquil. He had slept nearly an hour, and his pulse did not feel so rapid, nor so hard. That evening he got more sleep, and the following morning answered every question asked, in such manner as to convince every body that he was certainly better. To shorten the relation, I shall only add, that the discharge continued large for several days, and then gradually decreased: all his symptoms by degrees also disappeared, and in no great length of time, by proper care, he got very well.

When this patient was attacked with his first symptoms, I did not suspect the true cause. His want of sleep, his seeming anxiety, his taciturnity, and great unwillingness to answer any question, seemed to me to bespeak a return of his maniacal disorder. Upon this supposition I gave him the opiate, hoping, that if I

could procure sleep he might be better. But when I saw the altered appearance of the wound, and found that the pericranium had quitted its adhesion to the scull, I was no longer in doubt, that whatever else might concur to disorder him, yet all his complaints were fairly deducible from the effects of his fall. And I apprehend he owed the preservation of his life to the treatment he underwent, in consequence of such supposition.

CASE IX.

CONTUSION WITH WOUNDS.

A WATCHMAN, whose stand was in White-chapel, got into a scuffle with some drunken sailors, and received several wounds and blows on his head; from some of which he lost so much blood, that he was the next day brought into St. Bartholomew's hospital in a very weak low state.

Not one of the wounds, which were five in number, had passed the pericranium, but his whole head was very much swollen and bruised. He was in other respects very well; that is, he did not complain of sickness, nor any other kind of pain than what soreness the bruises necessarily occasioned; and he had the full and perfect use of his senses. As he had already sustained great loss of blood, and was more than sixty years old, I made use of no farther evacuation, but dressed his head superficially, and directed that he should be kept in bed. At the end of about a week, the general tumefaction was nearly gone, and all the wounds in a healing state; the man transgressed the rules of the hospital by staying out all night, and was discharged. On the fifteenth day from that of the accident, he came to me again, complaining of head-ach, giddiness, sickness, failure of strength, loss of appetite, and want of sleep.

All the wounds, except one, were perfectly healed; this was on the upper part of the right parietal bone; it was crude, spongy, and the exuberant flesh of such colour and consistence, as inclined me (considering at the same time his general symptoms) to suspect mischief underneath it. I took him into the house again,

and immediately removed a circular portion of the scalp, including the wound, and found both pericranium and scull in the state I suspected; that is, the former altered and detached, and consequently the latter bare. Neither the age, habit, nor state of the man, seemed to be capable of bearing free evacuation, nor did I in my own opinion believe that there was time for the experiment. I therefore perforated the middle of the bare part of the bone, and found a sufficient warrant for having so done; that is, a small quantity of matter on the surface of the dura mater. His head was dressed lightly, a little blood was drawn from one of his arms, and a clyster thrown up to procure a stool. The following night he passed ill; had a slight shivering, got little or no sleep, and complained very much of pain in his head; the bare membrane looked very crude, discharged a thin gleet, and pressed hard against the edges of the bone. The next day, his pulse being considerably risen, he was let blood again: that afternoon he had another rigor, and his pain as well as fever became more intense.

On the eighteenth day, finding him in every respect worse, I made another perforation just below the former, and gave thereby a discharge to a larger quantity of matter, which the close pressure of the dura mater against the edges of the perforation had hitherto confined. On the twentieth, he was indeed rather easier, but his fever was very high, and both the dura mater and sore in the scalp looked very ill; wherefore suspecting more matter, and being satisfied the man had no other chance for life, I made a third perforation close by the second. This procured so large a discharge of pus, that I was very apprehensive that the extent of the mischief was too great for the assistance of art to prove effectual in: however, I was happily disappointed: for in a very few days more, all his bad symptoms gradually left him, and the man got perfectly well.

From considering all the circumstances of this case, I am satisfied, that had not the cranium been perforated at all, the man must have died, from the collection and confinement of matter: and I am also as much convinced, that the two former perforations would have proved insufficient for the purpose, and that the man owed his preservation to the large removal of bone.

This is a point of practice, which has by no means been sufficiently attended to by practitioners, nor sufficiently inculcated by the writers of our country at least. Many, who see and are convinced of the justness and propriety of it, want authority to vindicate them in proposing or executing it; and some part of the disgrace which has been cast on the operation of the trepan has arisen from this cause. Practitioners have in general been afraid to make more than one opening, and that generally a small one. If the inflammation be of any extent, or the quantity of matter at all considerable, this one small opening must prove insufficient, either for the relief of the tense inflamed membrane, or for the evacuation of the fluid; and the only probable chance which the patient can have, must be from the removal of a large portion of bone; and this equally in the case of extravasation of blood or serum, as in that of abscess.

CASE X.

CONTUSION JOINED WITH EXTRAVASATION.

A FIREMAN, who was at work on the top of a house, fell in with the roof of it; he was taken out senseless, and brought in that state to the hospital.

He had on different parts of his body several wounds and bruises, but none of them seemed to be of any great consequence. On his head were four, one of some size, on the upper part of the frontal bone near to the coronal suture, two on the left parietal, one on the right side of his head, just above his ear, and a small bruise on the upper part of the os occipitis. Of all these wounds, the pericranium was divided in one only, viz. that near the coronal suture.

His wounds were dressed, he was largely bled, a clyster was thrown up, and a purging mixture was ordered to be given cochleatim, until he should have a discharge per anum. The next day he was in the same state, perfectly senseless, had the apoplectic stertor, a full labouring interrupted pulse, and some difficulty of respiration. He had four or five large stools, where-

fore his mixture was discontinued, but sixteen ounces more of blood were drawn from one of the jugular veins; which evacuation was repeated again in the evening of the same day, to the quantity of eight more. On the third day, being still perfectly stupid, discharging both urine and fæces involuntarily, and having still a full labouring pulse, both the temporal arteries were opened, and fourteen ounces drawn from thence. On the fourth, finding no alteration, and being satisfied that the man's state could hardly be made worse, I determined to perforate the cranium, and accordingly set a large trephine on the upper part of the frontal bone, where the pericranium had been divided. The dura mater was found to be thinly covered with grumous blood, some of which I removed, and thereby made way for the discharge of more. The next day (the fifth), finding that what discharge had been made, during the night, was bloody, and that the man was in no respect altered for the better, I thought I had sufficient authority for repeating the operation, which I accordingly did, close by and below the former; and as the blow, by which the wound had been inflicted, seemed to have been almost exactly on the top of his head, I made a third opening in the parietal bone, close to the suture. The appearance under all was the same as under the first, viz. a thin layer of grumous, or rather coagulated blood.

Next day (the sixth), toward evening, the man opened his eyes; and on the seventh in the morning he spake. The discharge of blood continued for several days, and at the end of about a week from this time ceased; the dura mater and the wounded scalp wearing as good an aspect as could be wished, and the patient being easy and rational.

On the eighteenth day, he complained of pain all over his head; was sick, reached to vomit, and said that he was faint and chilly. On the nineteenth, his face was flushed, his skin hot, his pulse quick and hard. He was let blood, and ordered to have a clyster, and to take some medicines of a febrifuge kind. A day or two more passed in this manner, his fever not violent, but rather increasing than remitting; his pain, though not acute, yet such as to deprive him of his sleep; little rigors occurring irregularly, no perspiration, and an excessive languor. At last, on the twenty-first day, on the upper part of the os occipitis, on the

right side where there had been a small bruise, a tumor arose, so characterised, as to satisfy me that the cause of the late alteration of circumstances lay underneath it: it did not rise to any height, and contained a small quantity of sanies, but covered a portion of bone which the pericranium had quitted. I removed the scalp, and would have set on a trephine, but the man obstinately refused to submit to it.

On the twenty-fifth day, he lost the use of his left leg and arm, and was at the same time much convulsed in his right; which paralysis and spasm continued until the twenty-seventh, and on the twenty-eighth he died.

Upon examining his head, a collection of matter was found under the bare part of the occipital bone; the dura mater under this matter was sloughy and putrid, and about a desert spoonful of matter lay between the meninges, just under the altered part of the dura mater. In the part where the bloody extravasation had been, every thing was perfectly fair and free from disease.

In this case, there seems to have been as clear a distinction between the bloody extravasation, with its effects, and the inflammatory state of the dura mater, with its consequences, as can be desired. All the first symptoms were such as were caused by mere pressure of the extravasated blood; an obliteration of every sensible faculty, attended with the principal symptoms of an interrupted circulation. Perforation of the scull, where this extravasation had been made, did, by giving discharge to the blood, happily remove these, and the man was getting well apace, until the ills arising from another cause, viz. the inflammatory secession of the dura mater in consequence of contusion, and that in another place, began to appear; they indeed made their attack rather late, nor did they rise so high as they most frequently do; but then it must be considered what discipline the poor man had undergone, and what evacuation had been made. Notwithstanding which, they bore their true, genuine, febrile, inflammatory character, and produced their most frequent event. What perforation of the os occipitale might have done, I cannot say; I fear but little, as the matter was not only upon, but underneath the dura mater, and that too diseased.

CASE XI.

CONTUSION WITH WOUND.

A DRAYMAN, drunk, and sleeping, fell from his dray, and his head was so squeezed between the wheel and a post, that a considerable portion of the scalp, together with the pericranium, was forced off from each parietal bone.

He was brought to the hospital senseless: he was largely let blood, and the separated scalp being so bruised and mangled as to afford no probability of re-union, it was removed, and the bone dressed with dry lint. The next day the man was so well, and so perfectly master of what sense he had, that I was inclined to believe, that a great deal of the last night's appearance was owing principally to liquor.

In ten days time, the edges of the torn scalp were digested, and bore all the appearance of sores in a healthy man. One of the parietal bones seemed disposed to granulate without any exfoliation, the other looked as if it would throw off a scale.

On the thirteenth day he was so well, that having a large family to work for, he desired to be discharged from the hospital, and to be made an out-patient; but his sores were still so large, and I had so often been deceived by the fallacious appearance of such cases, that I persuaded him to stay another week.

On the sixteenth day he complained much of head-ach, and said, that he was sick and chilly; on the seventeenth, the florid, granulated appearance, and laudable matter of the sores, were exchanged for a tawny, glassy surface, and a plentiful thin gleet. I bled him freely, and bid him keep in bed. On the same day, toward evening, he had a shivering, and, the day following, two more; that parietal bone (the left) which had hitherto looked as if it would be covered by a granulation, without exfoliating, now wore so diseased an aspect, that I fain would have set a trephine on it immediately, but the man would not permit me. Every other means were used, but to no purpose. The sore on the right side of the head continued to look well, but the scalp quitted its

adhesion to almost the whole left parietal bone, which bone looked very unlike to a healthy one.

On the twenty-third day from that of the accident, he died, having been paralytic in his right leg and arm from the twenty-first.

The appearance of the two sores, as well as of the two bones, were so different, that I had curiosity to see the state of the parts underneath each. On the right side, the dura mater was in a natural, sound, adherent state. On the left, it was separated from almost the whole bone, and covered plentifully by matter, and was, for about the breadth of a half-crown, sloughy; under the slough the pia mater was diseased also, and matter was also formed on the surface of the brain.

CASE XII.

The following case was brought into St. Bartholomew's hospital, while I was confined to my house by sickness. The account, therefore, of the patient, while living, is as taken by Mr. Earle, (the present Editor); and that of the appearance after death, is in the words of the late ingenious Mr. Partridge, who assisted Mr. Earle in the examination of the body.

On the tenth of February, 1765, John Biggs, a lad about thirteen years old, was driving a horse round a grinding-mill; the horse not being used to the work, ran round very fast; the boy fell, and received such a blow from some part of the frame in which the horse worked, that he lay, deprived of sense, for some time, that is, until somebody came in to inquire why the mill went so rapid. He had a small wound on the right side of his head, and no other apparent mark of injury. In a few hours, by the assistance of phlebotomy, he seemed to be very well again. His wound was dressed by the family apothecary for a week, during which time he did not seem to have any other complaint, except now and then having a slight head-ach. The wound not healing kindly, the boy, being a country boy, hired only for the

purpose of driving the mill-horse, and the people with whom he lived being tired of keeping him unemployed, he was brought to the hospital. The wound was not large, and although he did not seem to have any other complaint, was nearly three weeks in healing.

On the eighth of March, he was seized with a fever, beginning with a kind of cold fit. On the tenth he was much disordered, complained of acute pain in his head; and his wound, which had been healed, broke out again, the pericranium separating from the bone; on the twelfth, he became senseless to all outward objects, was convulsed in all his limbs, and jaw-locked. On this day Mr. Crane trepanned him on the upper, fore and right side of the frontal bone. On the surface of the dura mater was found a considerable quantity of good matter: on the next morning he died.

The dura mater was detached from the cranium for about an inch, all round the perforation of the bone; what matter had been formed on its surface had been discharged by the operation, and little or none lodged; the pia mater and brain sound in this part. At about two inches distance from the original wound, higher up, and nearer both to the coronal and sagittal sutures, was a small tumor about the size of a split garden bean; within this was a very little discoloured matter, and under it the bone was bare. The dura mater corresponding with this tumor was detached, black, and sloughy, and a considerable quantity of matter lay under this sloughy part, communicating with an abscess formed between the two hemispheres of the brain, on the right side of the falciform process.

SECT. III.

SEPARATION, OR DESTRUCTION OF BOTH TABLES OF THE SCULL, FROM CONTUSION.

The separation of a portion of the cranium, consisting of both tables, or of the whole thickness, happens not unfrequently in old or neglected venereal disorders. The disease, which in these cases

has its seat in the diploe, often spoils the whole substance of the bone, and produces a separation or exfoliation of its whole thickness: the dura mater being always found, in such case, to be covered only by an incarnation generated from its surface.

This kind of caries is sometimes of large extent, in one piece, but more frequently it is of smaller size,[u] and affects different parts of the same scull. The separated piece is generally quite carious, and appears as if it had been worm-eaten, (what the French call *vermouloue*). The surface of the bone so diseased is seldom much elevated, though generally somewhat; neither has it often the circumscribed form and appearance of a true node, as it is called; though now and then it has.

The scalp, which covers a bone in this state, is most frequently diseased also; sometimes with one large, ill-conditioned sore; but more often with a number of crude, foul, painful, serpiginous ulcers; through most of which a probe will discover a rough, bare bone; and from which is constantly discharged a greasy, stinking sanies. This complaint is generally accompanied by a nocturnal head-ach, pocky spots, and pains about the breast and shoulders; and is almost always preceded by the former, though very frequently that symptom ceases, either during the mercurial courses, instituted for that purpose, or when the pericranium covering the diseased part becomes foul and sloughy.

The proportion of extent of surface, which one table of these diseased parts of the cranium bears to the diseased part of the other table, is very uncertain, and often very unequal. Sometimes the alteration of the outer table is much more extensive than that of the inner; in which case, when the separation is made, the detached piece comes away very easily, and the uncovered part of the dura mater is small, compared to the size of the external sore; but sometimes, on the contrary, the disease occupies a more considerable extent of the inner table than of the outer, and thereby renders the case more difficult, and the cure more tedious.

A mercurial course begun even before the scalp covering the diseased parts shall have been ulcerated, though it be often suffici-

[u] I have seen, in one case, nearly the whole os frontale cast off; and, in another, the whole left parietal bone.

ent fully and perfectly to eradicate the lues from the habit, will neither prevent nor cure this local malady; which will therefore often remain, after such cause of it has been really and totally removed: the bone is thoroughly spoiled (at least in the parts affected); and although the disease, considered abstractedly, be cured, yet the texture of these harder parts necessarily requires more time to cast off what is unsound, and to put on a healthy appearance, than the softer do; the local distemper will remain a long time after. An inattention to, or a misunderstanding of this circumstance, has been the cause why many people have been harassed, and even destroyed with unnecessary mercurial processes, when the complaint has been truly local, which it frequently is after proper previous mercurial treatment. Such medicines will be found to be so far from hastening the removal, that, by spoiling the constitution, relaxing the solids, impoverishing and dissolving the fluids, and weakening the vis vitæ, they prevent nature from executing her own purpose, and really protract and retard that effect which they are used (though injudiciously) with design to expedite. Mercury is undoubtedly a specific for the venereal disease, but it is itself a poison. It will also cure some other diseases; but its effects on the human frame are neither light nor superficial. It becomes beneficial or prejudicial, according to the manner in which it is applied; and when it ceases to do good, it will most certainly do harm. This, though a very flagrant instance of it, is not the only one which might be produced; the same observation might be made on the maladies proceeding from a diseased prostate and urethra, producing indurations, and fistulæ in perineo, in which the persistance in the use of mercurials, after the producing lues has been cured, has cost many a man his life, by aggravating and continuing that symptomatic hectic fever (the necessary consequence of pain and irritation) which it should be the whole business of art to calm and attemperate. In all these cases, a strong decoction of sarsaparilla with milk for the common drink, a soft nutritive diet, a clear air, and the free use of the Peruvian bark, will be found to be more conducive to the patient's recovery, than any continued use of mercury. By the former he will

be restored and strengthened, by the latter he will be irritated, wasted, and destroyed.[x]

[x] Mr. Pott's remarks on the abuse of mercury are extremely valuable, and deserve every attention. Much mischief has certainly been caused by continuing to give mercury after the venereal virus has been subdued. Mr. Pott has in this place somewhat deviated from his subject of injuries of the head from external violence; but it was principally to shew the similitude between some exfoliations which are caused by the venereal virus, and others which are sometimes the effect of contusion. That large exfoliations do often happen in bones which have been affected with venereal virus, is very certain, though, without question, they are infinitely less frequent than formerly, the disease being understood, and more attention being paid to it in its earlier stages. It is now, even in hospitals and among the lowest order of persons, very rare to see a carious scull. However, what has been, again may be. I have certainly seen, as Mr. Pott observes, exfoliations almost to the extent of the frontal or parietal bones; but, by judicious management, I think this may sometimes be avoided. Exfoliation of bones cannot take place, most particularly from the cranium, without causing great deformity: it should therefore by all possible means be prevented. Bones being uncovered, and exposed to the air, is the great cause of exfoliation; and this it is the duty of surgeons as much as possible to avoid. What I would wish to inculcate is, that though through an opening in the scalp the probe discovers a bare bone with a rough surface, it should by no means be uncovered, as I believe has not infrequently been practised; and the admission of air through the small opening should be as much as possible prevented; or where there are several openings leading down to the diseased bone, the intermediate skin should be carefully preserved. If there be reason for suspicion that there still remains some venereal virus, every means which skill, assisted by mercury, can employ, should be used to stop the activity of, and eradicate the poison. When that is done, provided we do not irritate by repeated examinations, or the introduction of any foreign body, the diseased bone will often lie quiet, and any further destruction or deformity will be avoided.

As this observation appears to me important, I shall endeavour to illustrate it by relating a case which occurred several years past. I was sent for, to see an unmarried lady in a most respectable family, who had a sore on her forehead a little above the left eye-brow. On examination with a a probe, I found the bone bare; and on insinuating it further, it made its way over the whole surface of the os frontis, which was separated from the scalp, and very rough. The skin covering it was smooth, even, and of a healthy natural appearance. There was no other opening or communication with the bone, except that just mentioned: there were some other tumors or risings on other parts of the head. Considering all these appearances, which were accompanied with great and frequent pain in the head, I made no doubt of its arising from venereal poison in the habit. My opinion gave great offence, and I was informed that the lady, whose purity I had so boldly arraigned, had been twelve months under the care of the late Dr. F.,

The same kind of exfoliation or separation of both tables of the cranium, is sometimes the consequence of mere external violence.[y]

The four following examples, which have fallen within my own knowledge, I shall relate without any comment.

CASE XIII.

A GENTLEMAN's coachman was thrown from his box, on the road between London and Richmond, and received a wound in his forehead, which divided the pericranium, and denuded the bone about an inch above the sinus. The man received no other

who, had there been any grounds for my suspicion, must have discovered it. However, as it was not the first time I had witnessed the Doctor's total ignorance of this disease, though in other respects acknowledged by the world an excellent physician, and as I was well acquainted with the various forms and appearances the venereal proteus can assume, I would not give up my opinion; though at the same time I affirmed that the disease might be innocently caught, and mentioned some cases to prove this assertion. I was however informed that my future attendance would be dispensed with. About a week after, I was desired to meet Dr. F. and two other physicians, one of whom was the late Sir Richard Jebb, who, on seeing the case, immediately pronounced it venereal.

I was now intreated to take care of it, and by the usual means cured the disease. The pains in the head ceased, the small tumors subsided, and no exfoliation took place except at the wound, the rest of the forehead remaining perfectly firm, and the skin covering it without further opening or ulceration.

The disease was afterward traced from a woman with whom the lady had slept, and who had a venereal ulcer, which had probably been in contact with this unfortunate person in a part, from which the cuticle had been by some accident abraded. E.

[y] Morgagni deduces this from mischief done to the vessels of the diploe. "Antequam de calvariæ ictibus verba facere desinamus, illud non est præ-"tereundum, utraque ejus tabula prorsus illæsa, illæsisque subjectarum me-"ningum vasis, accidere aliquando ab ictu valido obtusi corporis, ut vascula, "quæ inter tabulas medullæ subserviunt, rumpantur, et sanguinem fundant; "qui procedente tempore corruptus, eoque acrior factus, quod succos me-"dullosus admisceatur, qui tum mora et calore, in pessimam degeneret ran-"cedinem, interiorem tabulam carie afficiat; hominique, jam ictu obluto, et "nihil ejusmodi timenti, intro defluens, meninges vitiet necenique afferat."

De Sedibus et Causis, &c.

harm in the fall; the lips of the wound were brought together by suture, and he drove home.

The next day his master, who was a governor of St. Bartholomew's, and a timorous man, sent the patient into that house. As he seemed perfectly well, and the wound looked as if it would unite without any trouble, I dressed him only with a superficial pledget. This did not succeed, and the edges, instead of uniting, became spongy. I therefore ordered him to be dressed with a little dry lint, thinking that the bare bone would soon throw off a small scale, and finish the matter. At the end of three weeks every thing was exactly in the same state; the bone bare, and not likely to exfoliate, and the edges spongy. Being in perfect health, the man was tired of the confinement of the hospital, and was permitted to go home, taking dressings with him.

At the end of two months from the date of the fall, he returned to the hospital again, and desired me to look at his sore; which was not only not healed, but discharged much too large a quantity of matter. The opening was about the size of a silver threepence, round, soft, and spongy: upon feeling with a probe, I thought that the bone receded too much for a mere loose exfoliation, and as the bone receded, the discharge of matter increased. Upon repeated trials, I was thoroughly satisfied that both these circumstances were true, and also that the loose piece was much too large to be extracted from the present opening.

I considered, that the removal of a circular piece of skin would leave a scar, which would not only be a great deformity, but a deformity which would be liable to misconstructions; and as there were no bad symptoms to be obviated, nor any thing to be done, but merely to remove the loose portion of bone, I made a longitudinal incision, sufficient for its extraction, and laying hold of it with a pair of forceps, brought it away. It was the whole thickness of the cranium, in every part firm, hard, and perfectly white; and it left the dura mater covered by a florid healthy incarnation. I laid the divided scalp down upon the membrane, without any intervening dressing, and the sore healed in a few days.

CASE XIV.

An elderly woman riding in a hackney landau, by a sudden jolt struck her head with great violence against an iron hook at the top of it, put there to hold the two parts of the roof together. The blow gave her exquisite pain for the instant, but that soon ceased; and as it caused neither wound nor tumefaction, she took no further notice of it. At the end of near two months, she was seized with a violent pain in her head; so violent, that for several nights she was obliged to have recourse to laudanum, in order to obtain a little broken rest.

In about a week her pain went off, and a tumor arose, just where she had been stricken; that is, just in the middle of the sagittal suture.

Mr. Brown, of Little Britain, had the care of her: with him I saw her; we opened the tumor, and discharged a considerable quantity of discoloured and very offensive matter. I passed my finger into the opening, and to my great astonishment found it touched the dura mater. We removed a circular piece of the scalp, and found the two ossa parietalia bare, and carious for a considerable extent on each side of the suture; and in the middle of this carious piece, just in the track of the suture, a hole large enough to admit easily any man's finger, without touching the edges of the bone.

No exfoliation was found in the matter, or on the membrane; the dura mater lay at a considerable distance from the scull, in that part; the discharge from within was large and very offensive; and about three weeks from the time of opening, she died suddenly in a kind of fit.

CASE XV.

In the middle of September 1763, a woman about sixty years old fell down stairs backwards; she was stunned by the blow which her head received from one of the steps, and lay senseless some time.

There was neither wound nor considerable bruise; she was let blood, and kept quiet for some few days; at the end of which, finding no inconvenience either general or particular, she ceased to regard it.

On the eighteenth of December, she was taken into the hospital, for a swelling on the right side of her head, nearly of the size of a split Seville orange. This tumor, she said, had been preceded by a severe head-ach without fever; but as she did not then believe that her fall had any share in the production of her present complaint, she said nothing about it.

Her head being shaved, the tumor appeared full of fluid. I divided the scalp, and let out a quantity of greasy offensive matter. Upon further examination, the bone was found to be bare and carious. I removed such a portion of scalp as brought the whole into view. The natural texture of the bone was destroyed, and in it were several holes, through which a probe might easily be passed, and from which matter was discharged in such manner, and with such motion, as plainly proved that it came from within the cavity of the scull.

She remained in the hospital until the middle of March; during which time no alteration appeared in any part of the bare bone.

The affairs of her family now required her to be at home. She was in perfect good health; was discharged from the hospital; and as she lived very near to me, one of my young gentlemen undertook to take care of her. On the twenty-eighth of March, 1764, a small part of the bare bone came away, and left the dura mater covered by an healthy incarnation; and on the twelfth of April following, the whole remainder, being about a third part of the parietal bone, did the same. From first to last she had no kind of uneasiness, and the sore healed without any trouble.

CASE XVI.

In that ever memorable defence, made by Capt. Gilchrist, on board (as I think) the Southampton man of war, against a most

shameful superiority of French force, a sailor received a severe blow on his head by a large splinter: a small wound and a considerable bruise were the immediate consequence; but they were so soon well, that the man did duty in a few days. At about seven weeks distance from the time of the accident, he began to complain of great pain in his head; which pain in a few days rendered him so incapable, that he was put into the hospital at Gosport. He remained there about three weeks, frequently but not constantly in pain; and during that time had three or four fits, like epileptic ones.

He was now sent to St. Bartholomew's hospital, and put under the care of Dr. Pitcairn, by whose order he was bled, purged, and took several medicines. The man having one day mentioned the circumstance of the blow, the doctor desired that I might examine him.

There was not the least degree of swelling or inflammation, no mark or vestige of a scar, nor any elevation of the scalp, or fluctuation of fluid, under it. While I was examining his head, he had a slight attack of spasm; but on my desisting he became easy and tranquil.

The circumstance of this attack, while I was pressing upon the part, did not at that instant strike me as worthy notice, but upon reflection it appeared much so. The next day I made the same experiment, with the same effect; that is, upon hard pressure he became convulsed, which convulsion ceased upon removing the fingers, but was followed by a rigor. On the following day I ventured to repeat the experiment; but the man was so immediately and so terribly convulsed, that I determined never to try it again.

I informed his physician of all that had passed, and we agreed, that considering the inefficacy of all that had hitherto been done, and what had lately happened, the most probable method of attempting his relief would be, by denuding and perhaps perforating the cranium, in the place where the pressure produced so strange an effect.

The next day I removed a circular piece of the scalp, and found the pericranium not of a healthy or sound colour, nor adherent to the bone; which bone was carious, and had several

small holes in it, through which a sanies rose and fell, according to the motion of the blood in the brain. I applied a large trephine, without any regard to the suture, and removed a piece of scull. During the time of the operation, the poor man suffered greatly from spasm; but that over, he became easy and quiet.

The dura mater was detached from the scull, and had matter on its surface; which matter was extremely offensive. The ensuing night he passed ill; and the next day had such a rigor, that I verily thought it was the last trouble the man could have. The day after this I found him vastly better; the discharge from his head had been large, but he had not suffered any return either of spasm or rigor, and his principal complaint was extreme lowness.

The physician prescribed for him; his medicines agreed well with him, and every thing for several days wore a favourable aspect. On a sudden he was seized with all the symptoms of a peripneumony, and, on the third day from that seizure, died. No apparent cause of mischief was found either within or on the outside of the head, the dura mater was well incarned, and no lodgement of matter.

SECT. IV.

FISSURES AND FRACTURES OF THE CRANIUM, WITHOUT DEPRESSION.

Fractures of the cranium were, by the ancient writers, divided into many different sorts, each of which was distinguished by an appellation of Greek etymology, borrowed either from the figure of the fracture, or the disposition of the broken pieces. These are to be found in most of the old books; but as they merely load the memory, without informing the understanding, or assisting the practitioner, modern authors have generally laid them aside.

This kind of injury is divisible into two general heads; viz. those in which the broken parts keep their proper level, or equality

of surface, with the rest of the scull, and those in which they do not; or, in other words, fractures without depression, and fractures with.

These two distinctions are all which are really necessary to be made, and will be found to comprehend every violent division of the parts of the scull, (not made by a cutting instrument,) from the finest capillary fissure, up to the most complicated fracture: for fissures and fractures, differing from each other only in the width of the breach, or in the distance of the separated parts, and the disposition of broken pieces in large fractures being subject to an almost infinite variety, distinctions and appellations drawn and made from these circumstances might be multiplied to even three times the old number, without imparting the smallest degree of useful knowledge to the man who should be at the pains to get them by heart.

What are the symptoms of a fractured cranium? is often asked; and there is hardly any one who does not, from the authority of writers, both ancient and modern, answer, vomiting, giddiness, loss of sense, speech, and voluntary motion, bleeding at the ears, nose and mouth, &c. This is the doctrine of Celsus, which has been most invariably copied by almost all succeeding authors, and implicitly believed by almost all readers.[z]

The symptoms just mentioned do indeed very frequently accompany a broken scull, but they are not produced by the breach made in the bone; nor do they indicate such breach to have been made. They proceed from an affection of the brain, or from injury done to some of the parts within the cranium, independent of any ill which the bones composing it may have sustained. They are occasioned by violence offered to the contents of the head in general; are quite independent of the mere breach made in the bone; and either do or do not accompany fracture, as such fracture may happen to be or not to be complicated with such other ills.

[z] "Igitur ubi percussa est calvaria, protinus requirendum est, num bilem "is homo vomuerit, num oculi ejus obcæcati sint; num per nares, auresve "sanguis ei effluxerit; num conciderit; num sine sensu quasi dormiens "jacuerit? &c. hæc enim *non nisi osse fracto eveniunt.*"

They are frequently produced by extravasations of blood, or serum, upon, or between the membranes of the brain; or by shocks, or concussions of its substance, in cases where the scull is perfectly entire and unhurt. On the other hand, the bones of the scull are sometimes cracked, broken, nay even depressed, and the patient suffers none of these symptoms.[a] In short, as the breach made in the bone is not, nor can be the cause of such complaints, they ought not to be attributed to it; and that for reasons which are by no means merely speculative. For the practitioner, who supposes that such symptoms do necessarily and certainly imply that the cranium is fractured, must regulate his conduct by such supposition, and remove the scalp, very often without either necessity or benefit; that is, without discovering what he looks for: and, on the other hand, if he does find the scull to be broken, believing all these complaints to be caused by, and deducible from the fracture, he will most probably pay his whole attention to that supposed cause, and may think, that when he has done what the rules of his art prescribe for such case, he has done all that is in his power—an opinion not infrequently embraced; and which has been the destruction of many a patient. For, as on the one hand, the loss of sense, speech, and voluntary motion, as well as the hæmorrhage from the nose, ears, &c. are sometimes totally removed by, or at least disappear during the use of free and frequent evacuation, without any operation on the scalp or scull; so on the other, as these symptoms and appearances are not produced by the solution of continuity of the bone, they cannot be remedied by such chirurgic treatment as the mere fracture may require.

[a] "Si læsus instar dormientis sensus expers deprehendatur; si oculi ejus "obcæcati fuerint; si obmutuerit; si bilem vomuerit; si animalis instar "malleo icti conciderit; hæc omnia maximam et subitaneam significant cere-"bri commotionem, perturbationem, ac concussionem *quæ non rara integro* "*manente, nec ulla ex parte rupto cranio,* mortem percusso adferunt."

PET. PAAW.

"Dans les playes de tête, les accidens que les auteurs anciens ont appellés "primitifs, parcequ'ils arrivent dans l'instant meme de la blessure, ne sont "nullement des accidens, ni des signes, de la fracture subsistante, mais des "accidens, & des signes, de la commotion de cerveau."

LE DRAN.

If any one doubt the truth of this doctrine, I would desire him to consider the nature, as well as the most generally successful method of treating these symptoms; and, at the same time, to reflect seriously on the operation of the trepan, as practised in simple, undepressed fractures of the scull.

The sickness, giddiness, vomiting, and loss of sense and motion, can only be the consequences of an affection of the brain, as the common sensorium. They may be produced by its having been violently shaken, by a derangement of its medullary structure, or by unnatural pressure, made by a fluid extravasated on its surface, or within its ventricles; but never can be caused by the mere division of the bone, (considered abstractedly,) which division, in a simple fracture, can neither press on nor derange the structure of the parts within the cranium.

If the solution of continuity in the bone be either produced by such a degree of violence, as hath caused a considerable disturbance in the medullary parts of the brain, or has disturbed any of the functions of the nerves going off from it, or has occasioned a breach of any vessel, or vessels, whether sanguine or lymphatic, and that hath been followed by an extravasation, or lodgement of fluid, the symptoms necessarily consequent upon such derangement, or such pressure, will follow; but they do not follow because the bone is broken; their causes are superadded to the fracture, and although produced by the same external violence, are yet perfectly and absolutely independent of it; so much so, that, as I have already observed, they are frequently found where no fracture is.

The operation of the trepan is frequently performed in the case of simple fractures, and that very judiciously and properly; but it is not performed because the bone is broken, or cracked: a mere fracture, or fissure of the scull, can never require perforation, or that the dura mater under it be laid bare; the reason for doing this springs from other causes than the fracture, and those really independent on it. They spring from the nature of the mischief which the parts within the cranium have sustained, and not from the accidental division of the bone. From these arise the threatening symptoms; from these all the hazard; and from these the necessity and vindication of performing the operation of the trepan.

If a simple fracture of the cranium were unattended in present with any of the before-mentioned symptoms, and there were no reason for apprehending any other evil in future, that is, if the solution of continuity in the bone were the whole disease, it could not possibly indicate any other curative intention, but the general one in all fractures; viz. union of the divided parts. But how can such union be promoted or assisted by perforation? it most certainly cannot; and yet perforation is absolutely necessary in seven cases out of ten, of simple undepressed fractures of the scull. Let us for a moment inquire why it is so. The reasons for trepanning in these cases are, first, the immediate relief of present symptoms arising from pressure of extravasated fluid; or second, the discharge of matter formed between the scull and dura mater, in consequence of inflammation; or third, the prevention of such mischief, as experience has shown may most probably be expected from such kind of violence offered to the last-mentioned membrane. These are the only reasons that can be given for perforating the scull, in the case of an undepressed fracture; and very good and very justifiable reasons they are, but not drawn from the fracture.

In the first case (that of an extravasated fluid within the cranium), the relief from perforation is not only sometimes immediate, but frequently is not attainable by any other means. This is a sufficient proof, not only of its utility, but of its necessity.

In the second, of formation of matter (between the scull and dura mater), it is the *unicum remedium;* there is no natural outlet by which such matter can escape; and the only chance of life is from the operation.

In the third, that of mere fracture without depression of bone, or the appearance of such symptoms as indicate commotion, extravasation, or inflammation, it is used as a preventative, and therefore is a matter of choice, more than *immediate* necessity.

Many practitioners, both ancient and modern, have therefore disused and condemned it; and have, in cases where there have been no immediate bad symptoms, advised us to leave the fracture to nature, and not to perform the operation as a preventative, but to wait until its necessity may be indicated by such symptoms as may both require and vindicate it. This is a point of the ut-

most consequence in practice, and ought to be very maturely considered.

They who object to the early use of the trephine, speak of it as being frequently unnecessary, and as rendering the patient liable to several inconveniences which may arise from uncovering the dura mater, before there is any good, or at least any apparent reason for so doing. And, in support of this their opinion, they allege many instances of simple fracture which have been long undiscovered, without being attended with any bad symptoms; and of others which, though known and attended to from the first, have done very well without such operation.

They who advise the immediate use of the instrument do it upon a presumption, that, in considerable violence received by the head, such mischief is done to the dura mater, and the vessels by which it is connected to the cranium, that inflammation of the said membrane must follow; which inflammation generally produces a collection of matter, and a symptomatic fever, which most frequently baffles all our art, and ends in the destruction of the patient.

What the former assert is undoubtedly *sometimes* true. There have been several instances of undepressed fractures of the scull, which, either from having been undiscovered at first, or neglected, or having been under the care of a practitioner who had disliked the operation, have done very well without it. This is certainly true, but is not sufficient to found a general rule of practice upon: in matters of this sort, a few instances are by no means sufficient to establish a precedent: what has been, or may accidentally prove beneficial to a few, may be pernicious to the multitude: that which is found to be most frequently useful, is what we ought to abide by, reserving to ourselves a liberty of deviating from such general rule in particular cases.

This is one of those perplexing circumstances, which all writers lament, and all practitioners feel, but which, instead of merely complaining of, we should endeavour, as much as in us lies, to correct.

In order to obtain what information we can on this subject, we should consider, first, what the mischiefs are which may most probably be expected to follow, or which most frequently do follow,

when perforation has been too long deferred, or totally neglected; secondly, what prejudice or inconvenience does really arise from, or is thought to be caused by the operation itself, considered abstractedly; and thirdly, what proportion the number of those who have done well without it, bears to that of those who may truly be said to have been lost for want of it, or of those to whom it might have afforded some chance of relief.

With regard to the first, I have already observed in the case of simple undepressed fractures, whenever the trephine is applied, it must be with design either to relieve, or to prevent ills arising from other mischief than the mere breach in the bone; which breach, considered simply and abstractedly, can neither cause such ills, nor be relieved by such operation. One, and that the most frequent of these mischiefs, is the inflammation, detachment, and suppuration of the dura matter, and consequently the collection of matter between it and the scull; a case, of all others attending wounds of the head, the most pressing, the most hazardous, and the least within our power to relieve. On this subject I have expressed my sentiments so much at large, under the preceding article *contusion*, that it is needless to repeat them here. I shall therefore take the liberty of referring the reader back to that, and only remind him of a circumstance well worth his attending to; viz. that there are no immediate or early marks or symptoms, whereby he can certainly know, whether such kind of mischief is done or not; and that, when such complaints come on as indicate that such mischief has been received, although the operation is all that is in our power to do, yet it is very frequently unsuccessful.[b] Indeed, the only probable method of preventing this

[b] The state of the dura mater, under simple fractures and fissures of the cranium, has been very nicely observed, and very justly described, by some of the best writers of antiquity.

"Si ad cerebri membranam usque pervenerit fractura, non redemus, sed "agnoscere conabimur utrum membrana ab osse recesserit, an affixa perma- "neat. Si enim ipsa manet, inflammatio nulla infestat vulnus, et pus coc- "tum apparet. Si cesserit membrana, augentur dolores, et febris similiter; "os alium sumit colorem; pus tenue, et crudum effertur; et si medicus ne- "gligenter rem tractat, nec *perforatione* utitur, hoc graviora symptomata "aboriuntur; nempe bilis vomitus, convulsio, mentis delirium, et febris "acuta." PAULUS ÆGINETA.

evil seems to be, the removal of such a part of the scull, as by being broken appears plainly to have been the part where the violence was inflicted; and which, if the dura mater becomes inflamed, and quitting its connexion suppurates, will, in all probability, cover and confine a collection of matter for which nature has provided no outlet. This I take to be, not only the best, but the only good reason, for the *early* use of the trephine in simple undepressed fractures of the scull: and I must add, that it appears to me to be fully sufficient to vindicate and authorise it. That it frequently fails of success is beyond all doubt; the extent and degree of the mischief being too great for it to relieve: but that it has preserved many a life, which must have been lost without it, I am as well satisfied of, as I am of any truth which repeated experience may have taught me.

In matters of this sort, positive proof and conviction are not in our power; all that we can do is, by making a comparison of the conduct and event of a number of similar cases, to come as near to truth as we can, and to get probability on our side.

The second consideration which I proposed to be made was, what mischief or inconvenience may most reasonably be supposed to follow, or to proceed from the mere operation considered abstractedly. They who are averse to the use of it, as a preventative, allege that it occasions a great loss of time; that it is frequently quite unnecessary; and, that the admission of air to the dura mater, as well as the laying of it bare, is necessarily prejudicial.

The former of these is undoubtedly true; a person, whose scull has been perforated, cannot possibly be well (that is, cured) in so short a space of time, as one who has not undergone such opera-

"Dico debet dari signum fracturæ, a qua removeatur panniculus grossus. "In primo debes scire dispositionem syphæ; utrum est adherens, an non; vi-"delicet, si adhæserit ossi non fiet in vulnus apostema calidum; et licet ac-"cidit, modicum erit; ærugo manabit de eo modica; et putredo erit di-"gesta. Sed si fuerit remotus, vehementiores erunt dolores, et febres, mu-"tabitur color ossis, et corrumpetur, et manebit de eo putredo tenuis."

RHAZES.

"Si rima sit in superficie, cerebri membrana non abscedente, eadem ad-"hibeatur, quæ ad os nudatum demonstrata est: cerebri vero membrana ab-"scedente, et humore ibi collecto, post primos curationis dies ad terebram "properandum est," &c.

ORIBASIUS.

tion; supposing such person to have sustained no other injury than the mere fracture: and if the majority of the people whose sculls are broken were to sustain no other injury, that is, if no other mischief were in these cases in general done to the parts contained within the scull, the objection to perforation would be real and great, and the operation a matter of more serious consideration. But this is seldom, too seldom the case; by much the larger number of those who suffer a fracture of the scull are injured with regard to other parts, and labour under mischief of another kind, additional to the fracture; that is, the parts within the cranium are injured as well as the cranium itself. This being the case, the loss or waste of a little time ceases to be an object of so great importance. The hazard which it is supposed may be incurred from laying bare the dura mater, is indeed a matter of some weight, so much so, that it certainly ought not to be done, but for very good reasons; and yet, although I am clearly of this opinion, I think that I may venture to say, that, let the supposed hazard be what it *may*, it cannot in the nature of things be by any means equal to that which *must* be incurred by not doing it, when such operation becomes necessary. In short, if we would form a right judgment of this point, the question concerning it ought to stand thus: Is the chance of ill which *may* proceed from merely denuding the dura mater, equal to that of its being so hurt by the blow, as to inflame and suppurate? Or is the mischief which may be incurred by mere perforation of the scull, equal to the good which it may produce? These questions, let those who have seen most business of this kind, and who are therefore the best judges, consider and determine. For my own part, I have no doubt, that although, by establishing it as a general rule to perforate in all cases, some few would now and then be subjected to the operation, who might have done very well without it; yet, by the same practice, many a valuable life would be preserved, which must inevitably be lost without it, there being no degree of comparison between the good to be derived from it, when used early, as a preventative, and what may be expected, if it be deferred till an inflammation of the dura mater and a symptomatic fever make it necessary.

The third consideration, viz. what proportion the number of those who have escaped without the operation bears to that of those who have perished for want of it, is in great measure included in the two preceding; at least the determination of them must also determine this.

My own opinion must, till I find reason to alter it, be the rule of my own conduct; and though I would not by any means pretend to obtrude the former on any one, yet I think it in some measure incumbent upon me in this place to give it.

The number of cases of this kind, which are necessarily brought into a large hospital so situated as Bartholomew's is, in the midst of a populous city, where all kinds of hazardous labour are carried on, has enabled me to make many observations on them; and although I have now and then seen some few of them do well without the use of the trephine, yet, the much greater number, whom I have seen perish with collections of matter within the cranium, who have not been perforated, and from whom there is no other relief in art or nature, has, I must acknowledge, rendered me so very cautious and diffident, that although I will not say, that I would always and invariably perform the operation in every case of simple fracture, yet the case must be particularly circumstanced, the prospect much fairer than it most frequently is, and my prognostic delivered in the most grounded apprehensive manner, when I omit it. I should be sorry to be so misunderstood, as to have it supposed that I mean to say, that I think the denudation of the dura mater a matter of absolute indifference, or that no ill can proceed from it; this, I know, is a point concerning which the best practitioners have differed, and concerning which we still stand in need of information; but I think I may venture to say, what is fully to my present purpose, viz. that enlarging the opening of a fracture, by means of a trephine, will not produce or occasion much risk or hazard, additional to what must be occasioned by the fracture itself, that has already let in air upon the membrane,[e] and therefore that consideration is, at

[e] It is to be remarked, that Mr. Pott has in this place been speaking of simple fractures of the cranium without depression, in which he appears inclined to recommend the use of the trephine as a preventative. I must confess

least in some degree, at an end; and the principal point to be determined still remains the same, viz. whether, upon a supposition that the dura mater may possibly not have been so injured as to inflame and suppurate in future, the operation ought not to be practised as a preventative, but, on the contrary, ought rather to be deferred until worse symptoms indicate the necessity of it? or whether it ought in general to be performed early, in order, if possible, to prevent and guard against very probable, as well as very terrible mischief?

I know that it may be said, that a fracture, if of any considerable size, or whose edges are fairly distant and unconnected, will of itself make some way for discharge from within; and so it certainly may, and does, in the case of an effusion of fluid blood; but even in this it very seldom proves sufficient for the purpose. But does not the distant separation of the edges imply greater separation of the attaching vessels of the dura mater? and does not experience too often prove this to be the case? In truth, the great advantage which is sometimes derived from considerable fractures, is most frequent in those cases where portions of bone are so loose as to be removeable, which removal of bone stands in place of perforation, and makes much more for the necessity of the operation in other cases than against it, if properly considered.

I may possibly be told, that Hildanus Wiseman, and others of great and deserved reputation, have been of the former opinion. I know they have; and when I differ from these, or any other

I cannot clearly perceive how a simple crack or fissure through the scull can be said to let in air upon the membrane; or, if it did, that it should be a reason for uncovering a greater part of it.

If I may take the liberty, after such great authority, to offer my opinion, I must say that I do not think the operation with the trephine is to be considered of lightly. If the injury which has been received be sufficient to produce mischief, we are by no means certain of finding the seat of it, nor of preventing it by making an opening. I am therefore decidedly against applying the trephine after every simple fracture or fissure, and think it better to defer the operation, till some symptoms indicate the necessity of it. This opinion is drawn from reasoning on the subject, and is confirmed by the many cases of simple fracture which I have known got well without any such operation. E.

good authority, I hope that I shall always do it with caution and diffidence; but I hope also, that I shall never hesitate to differ from any and every authority, when I think that I have truth on my side, and the good of mankind in my view. The above-mentioned writers, together with almost all their contemporaries, had, in simple fractures of the scull, but one contemplation, the extravasation of blood; this they regarded as the cause both of the early symptoms and of the late ones; considering it as acting either by pressure or putrefaction; and therefore, when there was no immediate sign of such extravasation from the effects of pressure, they saw no necessity for early or immediate perforation. But had they not forgotten the universal adhesion of the dura mater to the cranium; had they not, without any, or indeed contrary to all authority from anatomy, formed to themselves an erroneous idea of the disposition of those parts, with regard to each other;[d] had they conceived rightly of the consequences of an inflammation and detachment of that membrane, I am much inclined to believe, that they would have altered their opinion, and not in general have left penetrating fractures of the scull to nature; although they had, in some measure, the authority of Celsus for so doing.[e]

[d] Some of the writers of this time speak of the supposed vacuity between the dura mater and scull, as being calculated for the reception of extravasated fluid, in case of accident: which opinion reminds me of that of a much later writer, who says, "that the os unguis was made so thin, for its more easy "perforation in the operation of the fistula lachrymalis."

[e] "In omni vero fisso fractove osse, protinus antiquiores medici, ad ferra-"menta veniebant quibus id exciderent. Sed multo melius est ante em-"plastra experiri, quæ calvariæ causa componuntur," &c.

CELSUS.

Whoever has an inclination to amuse himself with the different opinions of different writers on the subject of perforating, or not perforating, will find them in Palfyn, Rohalt, and many others.

But that the frequent ill effects of neglecting this operation were not unattended to by many, the following quotation, taken from a number of similar ones, may evince:

"Et scias, sicut volunt veteres, quod non est excusatio ab incisione, et re-"motione cranii, cum in eo penetrans fractura sit; et hæc propter duo; "primo quod os capitis, sicut dictum est, debilem facit porum. Secundo, "quia si, osse jam restaurato, acciderit interius (quantocunque modice) gene-"ratio saniei, vel alicujus humoris superflui expellendi, quomodo, jam restau-"rato osse, posset expelli," &c.

Before I enter upon the account of the present and most proper method of treating simple undepressed fractures of the scull, it may perhaps be not amiss to make a short inquiry into the opinions which our remote ancestors have delivered down to us on this subject, to take a cursory view of their intention and conduct, and to examine whether the difference between their practice and ours be well grounded or not; it being neither antiquity nor novelty, but utility only, which can demand our regard.

That extravasation of blood, and formation of matter between the scull and membranes of the brain, were the two principal causes of bad symptoms and of death in fractures of the cranium, and that the only rational method of obtaining relief in either case was by making such an opening in the bone as would give discharge to the said fluids, was full as well known to our ancestors as to us. Their intention and ours, therefore, were essentially alike; and the material difference between our conduct and theirs consists in the manner in, and the instruments by, which we endeavour to execute such intention. When the breach in the bone was small, and no symptoms of immediate extravasation attended, their principal apprehension was, that the sanies, or matter, which they supposed must necessarily be excreted from the edges of the fracture, would drop down, lodge, and be collected on the surface of the dura mater.

To prevent this evil, they endeavoured to enlarge the fracture by abrasion of its edges, by means of scalpra, or rugines. These scalpra were many in number, and various in their size and figure, according to the opinion or whim of the practitioner. Figures of these are to be seen in many writers; in Andreas a Cruce, in Scultetus, in Fabritius ab Aquapendente, in Berengarius, &c. &c. &c.[f]

"Primum notabile est istud, quod in fractura cranii debes prohibere apos-
"tema, ne accidat in cerebro aut in panniculis, &c. Tertium, notabile sit
"istud; quod si intentio medici solum esset, in occupatione solutionis con-
"tinuitatis, vel fracturæ, stante apostemate, multa mala accidentia possent
"consequi, ut corruptio panniculi febris, apoplexia, rigor," &c.

BERTAPAL.

[f] "Ex fracturis vero quæ ad cerebri membranas pervenerunt, si simplex
"fractura sit, angustis scalpris utendum; sin cum contusione aliqua, quod
"contusum est excidi debebit; idque vel terebellis prius in circuitum fora-
"tum, ac mox scalpris admotis, vel protinus ab initio cyeliscis."

GALEN.

But whoever examines them, and attends to their proposed use, will find them liable to great objection; he will find that the use of them must be irksome to the patient, tedious to the operator, and unequal to the end proposed. That by such kind of instrument the opening of a small fracture may be enlarged, is beyond all doubt; but if the breach be at all large, or of any length, such method of enlarging it must at best be a very operose one; it must jar and shake the patient's head immoderately; if executed unskilfully, or inattentively, it must be attended with hazard of wounding the dura mater; and when finished, could not properly answer the purpose for which it was designed.

Of these defects, some of the practitioners were in some measure sensible; and therefore, when the fracture was of such size, or so circumstanced, that these scalpra abrasoria would most probably prove insufficient, that is, when the accident was produced by such force, or attended with such degree of contusion, as to render it probable that the parts within were injured, they did not then depend upon this method by abrasion, but had recourse to others by which they removed a portion of the cranium.[g] In the execution of this purpose, also, they found themselves subject to many inconveniences, arising partly from the awkward and unmanageable form and make of their instruments, and partly from the inartificial manner in which they applied them.

Terebræ, and terrebellæ, of various sorts, figures and sizes, the cycliscos, or scalper excisorius, and a variety of modioli were invented, and used for this purpose, figures of which may be seen in Vidus Vidius's Comment on Hippocrates de vuln. capit.; in Peter Paaw on the same; in Andreas a Cruce's Officina; in Albucasis and others.

When the piece of bone intended to be removed was larger than could be comprehended within the modiolus then in use, and which was a very defective instrument in many respects, the operation was performed by means of terebræ; which operation was

g "In iis quæ usque ad cerebri membranam divisa sunt, si sola rima sit, "iisdem radulis utendum; si collisio aliqua una sit, terebris exscindere colli-"sum oportet, scalpris adhibitis."

ORIBASIUS.

still more coarse, more fatiguing, and more hazardous than that by the mere scalpra.

The piece intended to be taken away was surrounded with perforations made at small distances[h] from each other, and then either the scalper excisorius or the scalprum lenticulatum was introduced, and, by means of repeated strokes with a heavy mallet, was driven through all the interspaces between each perforation. By these means the portion of bone so surrounded was removed, and the dura mater was laid bare. The tediousness which must attend the making so many perforations, the disturbance given to the patient's head, as well by the terebra, as by the mallet and chizel,

[h] "Ministri juxta assideant, quorum unus caput læsi contineat, alter, opportuna ministeria faciat. Aurium foramina lana coacta obturanda sunt, ne sonitu in excisione terreatur. His factis, infigendus calvariæ est mucro acutus terrebræ; qua læsum os colorem mutavit, juxta integrum; deinde lente habena terebram convertere debemus, donec inciso ossi mucro insistat; ac tum citatius circumagere oportet habena terebram convertente, donec mucro in spatium inter duplex os descendat; ubi autem foramen altius adactum sit ultra crassitudinem spatii inter duplicem testam ossis quod perforatur, tum terebra multo circumspectius convertenda est, ne repente descendens cerebri membranam violet. Cum jam terebra adacta fuerit, ut vel conjectura deprehendatur totam ossis crassitudinem esse perforatam, vel perparum solidæ sedis infra relictum, tunc is qui operatur, altitudinem degustet demissa tenuis acus obtusa parte; ac si quid continuæ sedis etiam reliquum sit, deprimendus altius terebræ mucro est, eaque lente circumacta, solidum os perforandum. Eadem quoque facienda sunt in aliis foraminibus, donec rima in ambitu perforata sit. Septa vero media inter foramina satis habent spatii, fere quantum specilli augusti aversa pars est. Factis foraminibus, tum ad excisionem, quæ dicitur, veniendum est, ut excisis tum foraminibus tum mediis, læsa ossa removeantur."

ORIBASIUS.

"Modus autem perforationis est, ut figas unum trypanorum (terebarum) super os in circuitu, et revolvas ipsum intra manus tuas, donec scias quod os terebratum est; deinde fiat permutatio ad alium locum: et sic permutatio fiat usque ad ultimum necessitatis. Deinde cum alio instrumento, quod dicitur spatumen, ab uno foramine usque ad aliud os incidatur," &c.

BRUNUS *Chir. Mag.*

"Pone trypanum supra os circa scissuram, ubi vis foramen facere, et revolve ipsum intra manus tuas donec penetret; deinde muta ipsum ad alium locum, et sic fac tot foramina, quot sufficiant; deinde pone spatumen in uno foraminum, et levando manum, superius incidatur terminus, qui est inter foramen et foramen, et fac sic donec separatur os totum."

BRUN. *Chir. Parv.*

the hazards of wounding the membranes of the brain, and the coarseness and unhandiness of the whole process, are too obvious to need a comment.[i]

Of this most of them were sensible; they felt the inconveniences, and dreaded the danger so much, as to run into great absurdities, merely to avoid them. They found that they not only wounded the dura mater, but sometimes the brain itself; and therefore had recourse to such precautions, as they thought most likely to prevent these evils. By some we are advised, not to make the perforation quite through the bone, but to endeavour to leave a thin lamina of it entire. By others, to leave the piece, which the modiolus or terebra had surrounded, adhering to the dura mater, to be cast off by its suppuration, lest the hasty detachment of it should be mischievous.[k]

[i] "Quod vero per cycliscos opus administratur, ne id quidem omnino vitio "caret, quum quatiat immodice caput, quod potius quietem postulat."

GALEN.

"At quæ per terebellam ratio quidem fungitur, parum tuta est, propterea "quod dum audacius eam tractant, duram meningem non raro violant."

GALEN.

"Sæpe scalpros pulsantes adeo ut totum cerebrum permoveatur."

GALEN.

"Acuta terebra quamplurimas angustas perforationes, cranii fracturas am- "bientes, radioli crassitudine equidistantes formare solent; quod vero inter "foramina residet, aut rectis, aut curvis scalpris malleolo plumbeo adactis "rescindere expedit. Lenticulato scalpro, adacto malleolo, id fieri potest; "*horridus* tamen quidem modus est, ac in opere tardus."

"Scalpra hæc omnia citra malleoli operam nullius momenti sunt; moventur "necessario malleolo adacto, præsertim in rimis, quæ ad diploidem usque "pertingunt; excavant totum os, *forti adhibita percussione, non tuto sed in-* "*commode.*"

ANDREAS A CRUCE.

"Malleus ad percutiendum lenticulatum debet esse de plumbo ut in parva "quantitate magis ponderet."

GUIDO.

"Cavere oportet ut in terebellæ admotione, ne falleris, verum qua parte "crassissimum os esse visum fuerit, in eam semper terebellam admotam "adigito."

HIPPOCRAT.

"Sæpe accidit, ut terebræ repente adactæ, ob naturalem perforatorum "ossium debilitatem, vel tenuitatem, membranam sauciarint."

ORIBASIUS.

[k] "Quod si statim initio vulneris inflicti, curationi adhibearis, os ad mem-

The cautions laid down by Hippocrates, and others, concerning the part of the bone whereon to fix the instrument, and the great attention which they admonish the operator to pay to its execution, all proceed from the same fear. For the same reason, or from the same well-grounded apprehension, it will be found that many of the best practitioners endeavoured to furnish their perforating instruments with such guards or defences as should prevent them from going too deep.[1]

In Albucasis, in Andreas a Cruce, and many others, are figures and descriptions of modioli, duabus, tribus, vel quatuor alis mu-

"branam usque simul et semel exscindere non oportet, &c. Præterquam "quod aliud subest periculum, si statim ad membranam usque auferas, ne "inter operandum membranam lædas. Sed inter secandum id observato, ut "postquam eo res perducta, ut parum absit quin universum os pertusum sit, "jamque os vacillare incipit, ab ulteriore sectione abstineas, ossique, ut "sponte porro secedat, permittas. Namque ossi, quod sectum est, et sine "exsectione relictum, nihil detrimenti accidere potest."

"Cum itaque terebræ occurrit usus, si statem curationi adhibearis, cavesis "ne ad membranam usque penetrat, verum portio ossis tenuis relinquenda."

HIPPOCRAT.

[1] "Terebellis autem ipsis, ut mergi non possunt supra cuspidem, nonnulli "supercilium extans efficiunt."

GALEN.

"At quia dum terebrum hoc circumagitur, periculum imminet ne mem-"branæ lædantur, ideo nonnulli quo minus aberrarent, et hoc periculi genus "evitarent, terebras excogitarunt quæ mergi non possunt, et ob id a Græcis "abaptista dicuntur."

ANDREAS A CRUCE.

"Si autem os forte durem est, tunc oportet ut perfores in circuitu ejus "antequam administres incisoria cum terebris, quæ nominantur terebræ non "profundantes; et non nominantur ita, nisi quoniam ipsæ non pertranseant "terminum ossis, ad illud quod est post ipsum, propterea quod terebro est "extremitas rotunda super illud, quod est sub capite ejus acuto, similis mar-"gini, et circulus parvulus prohibet submergi et pertransire spissitudinem "ossis. Et convenit tibi, ut accipias ex istis terebris numerum multum, quo-"rum unum quodque conveniat quantitati spissitudinis ossis, donec præsens "sit tibi omni cranio terebrum," &c.

ALBUCASIS.

"Modiolus fuit veteribus duplex, estque etiamnum hodie vulgaris, tum et "qui duplicem habet orbem, alterum supra alterum extantem. Hic abaptis-"tos Græcis; facit namque orbis sive limbus extans ne profundius mergi "queat. Hunc itaque describit Galenus 6. meth. cap. 6. Quidem autem quo "minus aberrarent, tales terebellas excogitarunt quæ mergi nequeant, quas "inde abaptista vocant. Circumcurrit enim parum, supra terebellæ super-

niti, of those, as well as of terebellæ, called abaptistæ, mespilatæ, tortulatæ, &c.: the number and variety of these are very large, although they are all formed upon the same principle, and all calculated for the same purpose, viz. to perforate the scull without wounding the membrane underneath. But whoever will consider the very different thickness of different sculls, and of different parts of the same scull, and at the same time reflect on the extreme awkwardness of all these instruments, will immediately see how very little dependence is to be laid on such defences, and how mischievous the use of them must very frequently have proved. In short, an attentive consideration of what our remote ancestors have delivered down to us on this subject may satisfy us, that their observations on the appearances and symptoms of the ills attending this kind of mischief, that is, fractures of the cranium, were in general extremely just and true, perhaps more so than those of many moderns; that their curative intention, or method of aiming at the relief or cure of such ills, was rational and just; but that the instrumental part of their art was so deficient, so awkward, and so unhandy, that they were thereby not only in general prevented from accomplishing the good they intended, but were not infrequently driven into almost unavoidable mischief.

Reduction of the number of instruments to be used in an operation, and an extreme simplicity and plainness in those which may be required, are a part of the merit of modern surgery.

The majority of the instruments, with which our ancestors perforated the cranium, were contrived to make way for the admission of other instruments; such as the scalper excisorius, the cycliscos, the scalprum lenticulatum, &c. with which they removed a portion of bone. Even the modioli, which were used by them,

" cilium circulus alius parvus. Sane expedit complures id genus ad manum " habere, ob quamcunque cranii crassitudinem; nam crassiori longior conve- " nit terebra, tenuiori brevior," &c.

PET. PAAW in HIPPOCRAT.

" Si autem validum fuerit os, prius illud terebellis abaptistis vacatis per- " foratur. Ejusmodi vero sunt quæ paulo supra acumen cuspidis eminentias " habent, impedientes ne ad cerebriusque membranam demergi possint."

PAUL. ÆGINET.

were so small in the diameter of the saw, as to take away a very small piece at each application; which circumstance necessarily lessened the benefit which might be expected from the use of it, and rendered its repetition more frequently necessary than it needed to have been, if it had been made larger.

Instead therefore of that strange variety and multiplicity of instruments, which I have already mentioned to have been used by them, we now require only a trephine of such a side as to remove a sufficient quantity of bone at once, and an elevator; or perhaps, now and then a pair of forceps. These are all we ever can want; and these may be so made, as to be manageable by the hand of any man of common judgment, with great ease to himself, with very little fatigue and no hazard to the patient. With these we can make as large or as small an opening in the scull as we please; either for the relief of the dura mater, for the discharge of blood or matter, or for the elevation of depressed or extraction of loose pieces of bone, and that without disturbing the patient greatly, or incurring any risk of wounding the brain or its membranes.[m]

I have already said, that what are called the principal and diagnostic signs of a fractured scull are by no means to be depended on, as indicating such mischief to exist; it can therefore be hardly necessary to observe, that what are called the uncertain signs require our regard still less. These have been mentioned by many writers, who have copied each other; such are, the holding a silk or horse-hair tight between the grinding teeth and the hand, and the making it vibrate by striking on it; the biting an

[m] It has been customary to make the handle of the trephine of iron, and to form the extremity of such handle in such manner, as to make it serve the purpose of an elevator; thus combining, as it were, two instruments in one. This, I think, is a great fault; such iron handle adds considerably to the weight of the instrument, and that in a wrong part of it; and thereby renders it less manageable. The handle of this instrument should be made of light wood, not too long, and of an octangular figure. Whoever will try the same instruments, thus differently made, will, I think, be immediately sensible of the preference due to the lighter handle. It is almost impossible for the handle of an instrument, whose point or extremity is to be worked with, to be too light. It is no uncommon thing to see couching needles, and instruments of like kind, laden with heavy bone handles; the inconvenience of which is too obvious to mention.

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hard body, and attending to the pain produced by such action; with several other of like sort; which, not to mention that they imply the patient to be sensible and intelligent, are so truly equivocal as to deserve no notice.[n]

All considerations, also, which are drawn from the manner in which the violence was given or received, from the weight or kind of weapon or body inflicting it, from the force of the blow, the height of the fall, &c. are all equally fallacious; for every body knows, that very terrible symptoms and consequences are sometimes produced by accidents seemingly slight; and, on the contrary, that people escape unhurt, from what might reasonably have been expected to have proved prejudicial to them. In short, nothing but the sight and touch are to be at all depended upon.

If the integuments be not wounded, or if the wound made in them be so small as not to admit a proper examination of the bone, and the circumstances of the case be such as render such inquiry necessary, a portion of the scalp should be removed. The manner of doing this has formerly been the occasion of much difference of opinion; but there can be no doubt about the greater propriety of removing a piece of the scalp for this purpose, by an incision in a circular form, it being that form which must afford the clearest view. If there be no wound, the point stricken should be made the centre of the incision; if there be a wound, such wound should be made the centre of the piece to be removed; and such piece should always be of size sufficient to render the application of the trephine easy.[o] [p]

[n] "Item percutiatur caput cum levi bacculo sicco, de salice aut de pino, "et pone aurem tuam apud caput; et si sanum est, tunc audies sonum sanum; "si fractum aut scissum, audies sonum mutum." LANFRANC.

[o] It may perhaps be remarked, that, through the whole of this treatise, whenever I have occasion to speak of the operation of perforating the scull, I mention the trephine only, and take no notice of the trepan, the instrument used by most of our immediate fathers, and still in use through almost all France; my reason is, that the latter is an unmanageable one, and liable to most of the hazard and inconvenience attending the terebræ and terebellæ.

[p] In a former part of this work, Mr. Pott has strongly expressed his disapprobation of removing any part of the scalp unnecessarily. On the same principle, if any doubt exists of finding such mischief underneath the scalp

If the scalp be wounded, and the wound be large enough to render the fracture visible, the course of that must be the operator's direction in making his incision; and if the skin be much torn and bruised, or spoiled, it will generally be found adviseable to take away all that is spoiled at once; as the removal of it will add very little to the patient's pain, or the length of the cure; and the leaving it in this state may be attended with great future inconvenience.

Scalping (as it is called) should always be executed with a knife, and that knife should be so held as to cut through the skin and pericranium in a perpendicular manner, down to the bone at once, that the size of the bare bone may be fully equal to that of the wound in the scalp.

It is hardly necessary to insert a caution against pressing hard with the scalping knife, in the case of large fractures, attended either with great separation of the broken edges, or with loose pieces, the danger is so obvious. And it is also as obvious, that there can be but one method of avoiding such hazard; viz. by removing the scalp from, or rather making the incision in a part beyond the fracture, and where the bone is firm and stable. By these means, not only the risk of hurting the membranes and brain will be avoided, but the whole mischief will be more fairly and clearly brought into view; a thing which sooner or later must be done, and is always best done at first. No part of the scalp should be wantonly or unnecessarily cut away: but it should always be remembered, that this operation is, and should be performed, with intention to bring, if possible, the whole fracture into sight; and that whatever falls short of fulfilling such intention (if practicable) is wrong, not only, as it does not immediately answer the purpose for which it is intended, but it generally puts the patient under a necessity of undergoing the same pain and trouble a second time.

When the cranium is laid bare, it may not be improper to re-

as will make removal of bone necessary, I should recommend to make a crucial incision, rather than at once to take away any part of the scalp. By a crucial incision, a satisfactory examination may be made; and if it be found unnecessary to proceed further, the scalp may be laid down again, and preserved: if found necessary, it may be easily removed. E.

mark, that writers in general have cautioned us to beware of mistaking either a suture, or the impression of a vessel on the surface of the bone, for a fracture: I say that they have in general cautioned us not to mistake one of these for the other, but have not informed us of the mark by which we may be enabled to make the necessary distinction, although such mark is almost constant and invariable. From the track of a fracture, or fissure, the pericranium is always found loose and detached; whereas to the arterial sulcus, and to the uninjured suture, it is always adherent; besides which, the edges of a fracture will always be found rough to the probe or finger, and the sulcus always smooth; not to add, that the disposition of the sutures is pretty certain, and their appearance in general not extremely like to that of a fracture.

When the scalp is much bruised, or wounded, such wound or bruise points out the place from whence the piece should be removed, in order to examine the bone; and, even although no fracture should be found, is an authority and vindication of such operation, especially if the general symptoms were at all urgent; such symptoms implying mischief somewhere, and such external mark rendering it clear, where the external violence causing such mischief was inflicted. But all the ancient, and many of the modern writers, speak of a particular kind of fracture, in which the scalp covering it is perfectly fair and uninjured, and this they call a contra-fissure. By the general account it is pretty clear, that the majority of those who have spoken of this kind of fracture have supposed that the breach made in the bone was most frequently in the part of the cranium diametrically opposite to that which received the blow; this the term *contra-fissure* implies, and this they most certainly do in general mean should be understood by it, as appears by their directing us to examine and to remove the opposite part of the scalp, if no mischief be found under the part stricken, and the patient labours under what are called the symptoms of a fractured scull.

If the symptoms of a fractured cranium were certain, and to be depended upon, this accidental circumstance, of a breach in the bone having been now and then found in a distant, or even in the opposite part, might be an inducement to look for such mischief

there, when it is not found under the part stricken. A fracture, we might then say, there is somewhere; and it having in some instances been found in the opposite part of the head, it might be right to look for it there. But as what generally pass for, and are called the symptoms of a fractured scull, are by no means to be depended upon, as indicating such complaint to exist any where, as they are producible by concussion, by extravasation, by contusion, &c. and are frequently found where the scull is entire and unhurt, they cannot be deemed a sufficient authority for removing the scalp where no apparent mark of violence is left. The smallest degree of wound or bruise will, in cases where the symptoms are urgent, vindicate the removal of scalp from such part; but where there is no local indication where to operate, I cannot see any vindicable reason for operating at all.[q]

The chirurgical intention in perforating the scull, in the case of simple undepressed fractures, is, as I have already observed, either to give immediate discharge to a fluid supposed to be extravasated between the cranium and membranes of the brain; or to obviate and prevent such ills, as may most probably be expected to arise from the contusion causing the fracture; or to let out matter already formed in consequence of the inflammation following such contusion.

In each of these it is most probable, that the mischief, be it which it may, either is or will be seated principally under the track of the fracture; and therefore, whenever the trephine is applied for either or any of these purposes, it ought always to be set on in such manner as that the fracture should, if possible,

q Morgagni, in his book *De Causis et Sedibus*, has very justly observed, "That if by contra-fissure was meant a breach in that part of the cranium "which is diametrically opposite to the part wounded or bruised, (as some "have affirmed,) there could be none of that difficulty which they all allow "of finding, or that frequent disappointment in not finding it at all, since an "inquiry into such opposite part must always have led to the discovery. So "that, instead of the term *opposite*, that of *another* part of the cranium ought "to have been used." And then the whole of this, which has puzzled so many, will amount to no more than what every practitioner must know, which is, that we frequently find, in cases of great violence, that the scull has been broken in a place very distant from that which received the blow, and which we are not led to the knowledge of by any apparent external mark.

traverse the circle described by the saw, or, at least, so that the instrument might always comprehend the fracture within it.

I am aware that the direction given by most of the old writers on this subject is very different from what I have mentioned; but the instruments with which they operated were so different from ours, and the advantages arising from the comprehension of the fracture within the trephine are so great, and so manifest, that I must take the liberty of inculcating a constant attention to it, as to a circumstance from which great advantages are derivable.

The saw or crown of the trephine should never be too small, especially if the patient be full grown; a circumstance which I thought it right to mention, because the instrument-makers are very apt to make them so.[r]

The number of perforations which it may be necessary to make, can only be determined by the nature of each individual case.

If the operation be performed on account of such symptoms as seem to indicate a bloody extravasation, and so free a discharge is produced by one opening, as alleviates or removes the symptoms, that one may be all that may be necessary; but if the first perforation only discovers the disease, and is not followed by such discharge as relieves or removes the symptoms, the operation ought to be repeated again and again.

If there be no symptoms of extravasation, and the instrument has been applied in a preventative sense merely, the length of the fracture must determine the number; one or two only may be made at first; and it may be right to wait for farther direction from future circumstances. The circumstances which may render a repetition of the operation necessary are, accession or increase of fever; large discharge of matter, or lodgement of the same fluid; inflammatory tension of that part of the dura mater

[r] The best practitioners have, at times, found themselves necessitated to apply the instrument repeatedly in the same case, in order to remove a considerable quantity of bone; and among the writers on this subject, are frequent relations of such facts. The practice is undoubtedly just and right; but I cannot help thinking, from what I have seen of the perforating instruments of many of our predecessors, that a part of their trouble, and of the fatigue of their patients in such cases, might have been much lessened, had the circle of their saw been larger. The advantage of a large circle is great; the inconvenience imaginary.

which has already been denuded, &c. Directions to be given by a writer can, on this subject, be only and truly general; all the rest must be left to the judgment of the surgeon, which judgment must be formed from the peculiar nature of each individual case.

When the operation has not been performed as a preventative, but to give discharge to that matter which a symptomatic fever indicates to have been formed, the quantity of such fluid, the extent of the secession of the dura mater, and the state of that membrane, must determine the conduct of the operator. The only chance of relief is, from laying bare a large portion of it, that the discharge may be as free, and the confinement as little as possible; nothing but this can do good; the space of time in which it may prove beneficial is very short, that once elapsed is absolutely irrecoverable; and the necessary operation for obtaining such end may full as well be totally neglected, as done by halves, or too late.

The extent of the injured and separated dura mater, and consequently of the vacuity for the formation and lodgement of matter, is a thing of so much consequence, that it is to be wished we were able to discover it with more precision and clearness than we seem to be able to do. It is the greatest circumstance of hazard to the patient, and of direction to the surgeon. It is that which, if undiscovered or neglected, must destroy the former, and that, which when discoverable, and attended to by the latter, is not only his information, but his vindication.

The concealment of the dura mater within the cranium is one great cause of this great obscurity. This necessarily prevents us from knowing the true state of that membrane, as much and as certainly as it is to be wished we could; but still I cannot help thinking, that there are some circumstances and appearances, as well before perforation as after, which, if carefully and duly attended to, may throw some light on this obscure part of surgery. For example; if, upon dividing the scalp, the pericranium is found to be altered, and perfectly separated from the scull, to which it ought naturally to adhere; or if, some few days after scalping, (as it is called,) the edges of such wound spontaneously quit their adhesion to the bone all round, to some distance, and instead of being firm, florid, and healthy, become loose, tawny, and flabby;

or if the scull, upon being denuded, is plainly of a colour different from that of a healthy sound bone, with a healthy sound membrane under it; or if such bone, after having been either accidentally or designedly laid bare, undergoes such morbid change of aspect, and the patient is at the same time restless and feverish, with tensive pain in the head, and irregularly returning fits of heat and chilliness; I think that we may most reasonably presume, that the dura mater in such patient is inflamed; and that the seat of such inflammation is under such bare and altered part of the scull.

This presumption, as I have just observed, may take place before perforation; but, if added to these circumstances, which appear before the operation, we find upon perforating that the membrane is inflamed, detached, altered from its natural texture and brightness, or smeared over with matter, the case is then clear, as to its nature; and it is as clear, that nothing but the removal of a considerable portion of the scull can either give room for the inflammatory tension of the membrane, or make way for the discharge of matter generated on its surface; the two circumstances on which the well-being of the patient depends, the two intentions which must be fulfilled, and which nothing but free perforation can enable us to fulfil. Whatever degree of hazard may be supposed to be incurred, by having exposed the dura mater to the air, cannot be increased by the mere comparative size of the opening; and if we may be allowed to expose our patients to any risk at all, it can only be upon a supposition that a greater degree of good may be deducible from it.

It sometimes happens, that one of the bones of the scull is cracked, and the dura mater underneath such crack is so injured as to become inflamed, and in process of time to suppurate; but there being no early or immediate symptom of such mischief, and the scalp being neither wounded nor bruised in such manner or degree as to authorise the removal of the scalp, the true nature of the case is not known, nor the impending mischief attended to, until the symptoms of inflammation begin to appear. In this situation, after an uncertain number of days, (sometimes more, sometimes less,) the patient finds himself out of order, is restless, does not get natural or quiet sleep, is flushed and chilly by turns, feels pain of the dull tensive kind all over his head, but particu-

larly in the part where the blow was inflicted. Soon after he has got into this state, the part so pained becomes in some degree tumid, the febrile symptoms advancing notwithstanding every internal assistance. If in these circumstances the tumid part of the scalp be divided, and the cranium be found bare, (the pericranium having spontaneously quitted its adhesion,) whether it be broken or not, mischief is certainly forming[3] underneath it, and the one remedy is perforation.

It also sometimes happens that a fine capillary fissure runs or is continued under an undivided part of the scalp, from the extremity of a fracture to a distance greater or less; or, in other words, the fracture in its track, from being open and apparent, becomes capillary, and is either not seen or not attended to. If the dura mater, under such fissure, does not become inflamed, it may possibly never give any trouble; but if it does become inflamed, and suppurate, the scalp covering such fissure will, at the end of some days, swell, and become tender to the touch; the pericranium will, by separating from the bone, form a sinus along the track of the fissure, a discharge of gleet will be made from it upon pressure, and the division of it will display the breach in the bone.

Notwithstanding the fracture from which this fissure is continued be large and open, and the trephine may also have been more than once used to such fracture, yet, when the appearances are such as I have related, if the patient be not entirely free from all general symptoms of inflammatory mischief, it may be depended upon, that the membrane under the fissure is diseased; and if a convenient opening be not made upon the part aggrieved, bad consequences will follow, notwithstanding all that may have been done to the more visible and open part of the fracture; a very strong and convincing proof of the nature of a local inflammation of the dura mater, as well as of the most proper method of treating such disorder.

In cases of great violence offered to the head, whether the scull

[3] "Ossium rima oculta interdum non ante septimum diem, interdum non "ante decimum quartum, interdum serius se ostendit; tum caro ab osse re-"cedit; tumque os lividum apparet; dolores item ichorum diffluentium ex-"citantur; atque hæc difficulter remediis cedunt." HIPPOCRAT.

be broken or not, it sometimes happens, more particularly in young subjects, that we find a suture considerably disjoined; in which circumstance I do not remember ever to have seen one single instance of a recovery.[t]

I cannot take leave of this subject without reminding the young practitioner, that although it be impossible for any one, in the case of a highly inflamed or suppurating dura mater, to get well without perforation of the scull, yet that operation must be considered only as one absolutely necessary part of the process toward obtaining a cure; and that phlebotomy, gentle evacuations per anum, proper febrifuge remedies, and a strict low diet and regimen, will be full as necessary after such operation as before it. The removal of a piece of bone takes off some pressure from the tense and inflamed membrane, frees it in some degree from its confinement, and gives discharge to matter and gleet; but it does no more; and every means which can serve to appease the febrile heat, to lessen the velocity of the circulating fluids, to render the skin perspirable, and the patient cool and easy, are full as necessary after as before such operation.

CASE XVII.

SIMPLE FRACTURE.

A PRINCIPAL overseer of one of the great roads near to this town was thrown down with great violence, while he was giving directions to the labourers. He fell with his forehead against a sharp stone, and lay senseless for a few minutes, but soon recovered himself, and walked home. The stone had made a considerable wound, the lips of which were so torn and bruised, that the surgeon who first saw him cut them away, and by that means detected a fracture, or rather a fissure, of about an inch and a half

[t] "Repentina suturarum disjunctio, si causam attendas, sine aliqua cerebri "concussione esse non potest: si effectum, non sine violenta crasse meningis, "illuc magis adhærentis distractione, ac annectentium sibrillarum ac vascu-"lorum laceratione," &c.

MORGAGNI *De Causis et Sedi.*

or two inches in length, on the upper or middle part of the os frontale. The man had neither sickness, giddiness, vomiting, fever, nor any other bad symptom for several days; on which account nothing was done to the fracture, which was dressed with dry lint only. He was twice let blood, and kept to a low cool regimen. At the end of seven days, he found himself so well, that he was desirous of going out; but that not being permitted, he stayed at home, and took great care of himself. On the eleventh day he found himself out of order, said that his head ached, that his stomach was not right, and ate no dinner. The following night he got but little rest. On the thirteenth day, having passed very unquietly the preceding night, he did not rise; and when his surgeon came to dress him, finding him feverish, he let him blood, and gave him a lenient cathartic. In the space of two days more all his symptoms were exasperated; his head-ach was great and constant, his fever high, he got no sleep at all, the edges of the wounded scalp became foul, loose, and spongy, and his forehead and visage were attacked with an inflammatory swelling of the erysipelatous kind. On the sixteenth day he had a severe rigor, and was somewhat delirious, and his eyes became so tumefied that he could not open them. In this state I found him. Being informed of what I have here related, and having examined the bare cranium, I could not hesitate to say, that I apprehended his complaint proceeded from the formation and confinement of matter within the scull; and that the little chance the man had must be from immediate perforation in the track of the fissure.

The operation was performed, and the dura mater found covered with matter. He was dressed lightly, and lost twelve ounces of blood.

The next day I was informed that he was very rational, but his fever unremitting, and that he got no sleep. On the nineteenth day I saw him again, along with the late Mr. Bethune; the discharge from within the scull was large, and the bare bone and wounded scalp looked very ill; all his other symptoms much the same.

On the twenty-first I was sent for again. He was now delirious in a high degree, paralytic in one arm and leg, and frequently convulsed in the other; the discharge was large and remarkably

offensive, his tongue black, the skin of his body burning hot and dry, that of his extremities cold and moist, and I suppose I need not tell the reader what happened that night.

CASE XVIII.

A young man playing at cudgels in Moorfields received a stroke on his forehead; it did not seem either to himself or the spectators to have been a severe one; but as it produced blood, it was deemed by the laws of the game a broken head, and he was obliged to yield to his antagonist.

As it gave him no trouble, he took no notice of it; was for several nights afterwards engaged in the same diversion, and followed his daily labour. On the ninth day from that on which he received the blow, he thought that his forehead was somewhat swollen, and felt tender to the touch; on the eleventh it was more tumefied and more painful, and on the twelfth he found himself so much out of order, that he applied to be received into St. Bartholomew's hospital.

An incision was made into the tumor; a thin brown ichor was discharged; and a bare bone being discovered, a circular piece of the scalp was removed, which discovered a fracture. The trephine was applied twice along the track of the fracture, by which means it was almost totally removed. The dura mater was found discoloured, and beginning to have matter on its surface. The patient was let blood, and ordered to take the sal absinth. mixture, with a few grains of rhubarb in it every six hours. The succeeding night was passed ill; the patient complained much of pain, and got little or no sleep. On the fourteenth his fever was high, his skin hot, and his pulse full and hard; fourteen ounces more of blood were taken from one of the jugulars; and as he still continued costive, a lenitive purge was given a few hours afterwards. On the seventeenth every thing bore a bad aspect, both as to his wound and his general state; he got no rest, his fever was high, and the wound very ill conditioned. His head was again carefully examined, in order if possible to discover some other injured part. No such injury was found; and it being

impossible that he should remain in his present state, evacuation seemed to be his only chance, and therefore fourteen ounces more of blood were drawn from one of the temporal arteries, by which he fainted, and afterwards seemed to be somewhat easier.

For three days from this time he seemed to be considerably better; but on the twenty-first he was again in as much pain as ever, and the sore again began to put on a bad aspect.

The benefit which he had once already received from phlebotomy had been manifest; and as his pulse was well able to bear it again, the temporal arteries were again opened, and he was bled till his pulse failed so much and so suddenly, that I was not a little alarmed. By proper care he was brought to himself, and I had no other trouble during his cure than what proceeded from his extreme weakness, which the bark soon removed.

Although this man may very justly be said to have been saved by the frequent repetition of phlebotomy, yet as matter was beginning to be formed on the surface of the dura mater, and as such matter could have no outlet whereby to escape, it is very clear, that, unless the cranium had been perforated, he must have perished.

CASE XIX.

The driver of a post-chaise was thrown from his horse near Ware in Hertfordshire, and struck his head against what they call a stepping stone in a wash-way. He was stunned by the blow, and carried into a public house; but in half an hour's time found himself so well as to be able to carry the chaise to the place he was going to, which was just by. The next day finding himself perfectly well, he went to work again, and continued to do so for six days. On the seventh, he found himself sick, vomited twice, and had a kind of fainting fit followed by a great pain in his head, and some degree of fever. From the hardship and the irregular manner of these people's living, his complaints were supposed to be owing to cold, and to intemperance, and he was treated accordingly: but on the ninth day, a tumor appearing on that part of his head which had received the blow, a surgeon ex-

amined it, and, upon opening the tumefied part, found a fissure running diagonally across the whole parietal bone. The next day he was brought to St. Bartholomew's hospital. His skin was hot, his pulse hard and quick, and he complained that his head felt as if it was squeezed between two trenchers. The whole fissure being brought into view, the trephine was applied three times along the track of it; from each perforation a quantity of matter was discharged, and under each the dura mater was much altered. All possible care was taken of him, but to no purpose: every day produced an exasperation of his symptoms. On the fourteenth he became paralytic on one side, and on the sixteenth sunk into a state of perfect insensibility, and toward evening died. The whole internal surface of the left parietal and temporal bones was detached from the dura mater, and covered a large quantity of matter.

CASE XX.

A BRICKLAYER'S labourer was knocked down by the fall of a large heavy pantile, which made a large wound in the scalp, and broke the scull. The fracture began in the left parietal bone, and, traversing the coronal suture, ran about an inch in the os frontale.

He was soon brought to the hospital, where the scalp was immediately removed, so as to make way for the trephine; which instrument was applied on each side of the suture, in such manner as to comprehend the fracture in each application of it.

The dura mater was found to be uninjured; there was neither extravasation, nor any other mark of mischief. The patient was freely and repeatedly let blood, kept to a proper regimen, and prescribed for by the physician. In two months he was discharged perfectly well, and had not during his cure one single bad symptom.

It may very reasonably be remarked, that this was one of those cases which might have done well without the operation, which I am much inclined to believe: but does not this case, as well as

many others of like sort, prove also, that the laying bare the uninjured dura mater is not a matter of such hazard, as some have supposed it to be?

CASE XXI.

A GIRL about nine years old fell from the top of a pretty high hay rick at Islington, and pitched with her head on the ground, which was hard and dry. She was carried home bleeding freely from a wound on one side of the upper part of the head, and a surgeon in the neighbourhood examining her, found that her scull was broken; upon which she was brought to the hospital. The fracture was detected; it began in one parietal bone, and, passing the suture, ended in the other, making a course of about three inches in all. It was open, and blood discharged through it.

The trephine was applied to it on each bone; the dura mater was not hurt. She had neither sickness, stupor, pain, nor fever, and got well without any trouble; not even an exfoliation from the bare cranium.

The same remarks as were applicable to the foregoing case are, perhaps, equally so to this.

CASE XXII.

A FARRIER'S servant received a blow from the foot of a horse which he was shoeing. The blow knocked him down, and bereaved him of sense. He lived near Smithfield, and was brought to the hospital senseless.

I saw him in less than half an hour, and found him to all appearance well, his senses perfectly recovered, and no remains of the injury visible, save a small bruise on his forehead. A discutient cerate was applied to the bruise, he was let blood, a purge was ordered for the next day, and he was advised to keep very quiet.

On the third day he was perfectly well, had no general com-

plaint, and the bruise on his forehead was what is commonly called black and blue.

He continued well until the evening of the seventh day, in which he complained of being faint, chilly, and uneasy in his head, particularly his forehead. The following night he was restless, and in the morning was sick and giddy, and had no appetite. His pulse was very little risen; however, twelve ounces of blood were taken from his arm, and he was ordered to take the sal absinth. mixture sextis horis, and keep in bed. The ninth and tenth days were passed in much the same manner; but on the eleventh his fever rose high, and the part of his forehead which had received the blow became swollen and tender. On the thirteenth the tumefied part palpably contained a fluid, and was therefore opened. A fracture about two inches in length was discovered, running from just above the frontal sinus upward. The trephine was applied in the most depending part, and matter found between the membrane and bone. The day after this operation, finding his pulse to be full and hard, I bled him so freely that he swooned, and was some minutes before he recovered. That night he passed much easier; and although the discharge of matter was considerable for some time, yet, by proper care and due management, both physical and chirurgical, he got well.

I will not assert it to be a general fact, but as far as my own experience and observation go, I think that I have seen more patients get well, whose injuries have been in or under the frontal bone, than any other bones of the cranium. If this should be found to be generally true, may not the reason be worth inquiring into?*

* That this is true, has been proved by many instances. The cause is in great measure assigned, if we recollect that the cerebrum may be hurt with less danger than the cerebellum; and that the greater the distance of a wound from the cerebellum, the less danger there is of that part of the contents of the cranium being injured. It has been frequently demonstrated, that great part of the cerebrum may be taken away without destroying the animal, or even depriving it of its faculties; whereas the cerebellum will scarcely admit the smallest injury, without being followed by mortal symptoms. E.

CASE XXIII.

A LAD about seventeen, the son of a plasterer, was at work with his father at the mansion-house, and fell from a scaffold a considerable height. He lay senseless for some minutes, but in a little time was so much recovered as to walk. On the left side of his head was a small bruise, which gave him little or no pain. He had no symptoms which indicated that he had sustained any mischief; and after having staid at home a day or two at the persuasion of his mother, he returned to his business. On the ninth day from that of his fall, he was seized with a violent shooting pain in his head, was sick, and had a kind of convulsive fit.

As it was not supposed that his fall had any share in that attack, no notice was taken of it; a few ounces of blood were drawn from his arm, and the apothecary who had the care of him gave him some of those medicines that are called nervous.

His head-ach, fever, and watching, continued without remission for several days, and at the end of three weeks he died, paralytic on one side, and convulsed on the other.

A small swelling having appeared on his head three or four days before his death, his father desired me to come and look at it, after that event had happened.

The pericraninm was separated from the left parietal bone quite across, by means of a fracture which traversed the length of the whole bone. A quantity of matter was lodged between the inner surface of the said bone and the outer one of the dura mater, and a smaller collection of matter was also found between the membrane and the pia mater.

CASE XXIV.

A YOUNG man about twenty-two was brought into St. Bartholomew's hospital, considerably hurt by a fall from a high scaffold.

The radius of his right arm was broken about its middle; the

tibia and fibula of his left leg were both broken, and one or two of his ribs.

By proper care, in about five weeks, he was so well as to be permitted to get out of bed. The first day of his rising he complained of being sick and giddy, which was imputed to weakness and confinement, and therefore disregarded. For three or four days after this period he complained of constant pain in his head, got no sleep, and was constantly feverish. As he had never made any complaint of his head, nor had apparently sustained any injury on that part, Mr. Nourse (whose patient he was) could not suspect any, and therefore contented himself with the common antiphlogistic regimen. At the end of the sixth week, he complained that his head was painful to the touch; and, the day after he had made this complaint, he had a severe rigor, which lasted half an hour. On the twenty-ninth day, a swelling, palpably containing a fluid, appeared on one side of his head. Mr. Nourse opened it, and found a fracture of the parietal bone three inches long at least, through which matter issued freely. The trephine was applied, a large quantity of matter was discharged, and the dura mater was found sloughy; under which sloughy part was another collection of matter between the membranes, and under this latter abscess the brain was considerably discoloured. He died on the fiftieth day from that of his fall.

CASE XXV.

A boy, belonging to a horse-dealer in Smithfield, was thrown from a horse, with great violence, against one of the sheep-pens. He had a large wound and a fracture, which began about the middle of the frontal bone, and, passing the coronal suture, ended in the right parietal.

A trephine was set on the fracture in the frontal bone, and a small quantity of grumous blood discharged from between the cranium and dura mater. All that day and night he continued senseless; but the next day, by means of a second plentiful bleeding, he recovered his senses. To render every thing (as I hoped)

secure, a small trephine was applied on the other side of the suture, which seemed to comprehend all the breach made in the parietal bone.

For nine days from this time every thing looked well, and the boy was free from complaint; but, on the twelfth from the accident, he complained of being much out of order; and the next day the sore looked ill, and a thin gleet was discharged from the dura mater through the lint, which now stuck fast to it, instead of coming off easily as usual, and covered with good matter.

For three days from this time, both the boy and sore remained in much the same state. On the seventeenth, in dressing him, I observed a spongy kind of papilla on one part of the sore, which was very tender to the touch, and from which was discharged, upon pressure, a thin sanious kind of fluid: by means of a probe passed through this papilla, I discovered a sinus with bare bone its whole length: the division of this detected a capillary fissure, of at least two inches in length. A trephine was set on it, and the dura mater was found discoloured, and with matter on its surface. By means of free evacuation at first, and as free use of the bark afterwards, this patient got well.

CASE XXVI.

Two female inhabitants of St. Giles's got drunk together, and quarrelled; one of them threw a stool at the other, and knocked her down. The edge of the stool cut through the scalp, and broke the left parietal bone. The fracture ran from the middle of the bone as far as the sagittal suture. The girl was dressed that night by somebody in her neighbourhood, and was brought the next morning to the hospital. As she had no bad symptom of any kind, the operation was deferred, and she went on very well for a week; at the end of which time she began to complain in such manner, and her sore shewed such an aspect, that I thought there must be mischief under the cranium. A trephine was set on the fracture; the dura mater was found sloughy and purulent. She was bled again freely, and took proper medicines. On the fifteenth day she had a shivering, and after it a very brisk fever.

On the seventeenth she was worse in every respect. On the eighteenth a tumor appeared on the other side of the head. This was opened, and a fissure discovered in the right os parietale. A trephine was set on this fissure, and a discharge given to a large quantity of matter. Every thing that could be done for her was done; but on the twenty-third day she died.

The dura mater was separated from both the parietal bones, and matter found in large quantity under each.

It was for many years a generally received opinion, that one use of the sutures of the cranium was, to prevent the passage of a fracture from one of the bones to another.

This purpose they may undoubtedly have often accidentally served; but that they are generally incapable of so doing, manifold experience evinces. Fractures are often seen to pass regularly through a suture, from one bone to the adjoining, without any discontinuation or impediment. This is a fact which ought, by writers and lecturers, to be constantly inculcated, as an inattention to it may be of very bad consequence to individuals; for the practitioner who supposes that a suture will certainly, or not unfrequently, set bounds to a fracture, will, when he has traced such a kind of breach in one bone as far as the suture into which it may happen to run, not think it at all necessary to go farther and examine the adjoining bone.

A suspicion of the stricter adhesion of the dura mater to the scull at the places of these sutures than every where else, the situation of what are called sinuses immediately under the sutures, and a fear that either high and dangerous inflammation must follow the violent detachment of a part of them, or that an unrestrainable and fatal hæmorrhage must ensue from a breach of those vessels which pass from the sinuses through the sutures, have deterred most of our ancestors from meddling with them, and induced them to deliver down to us frequent prohibitions against the application of perforating instruments upon them. Neither of these apprehensions is founded in fact, or in strict truth. The separation of the scull from the longitudinal sinus is not attended necessarily with any kind or degree of inflammation peculiar to itself, or more than any other part of the dura mater; nor is the laceration or breach of the communicating vessels between this sinus

and the suture which covers it, necessarily followed by any such degree of hæmorrhage as to prove hazardous or alarming; as I have more than once experienced.

A perforating instrument most certainly ought not wantonly or unnecessarily to be set on this part; and this for a reason not drawn from any peculiar hazard attending such operation. The larger size, and greater number of vessels here than in other parts of the bone, will certainly cause such a degree of bleeding, or hæmorrhage, as, though easily restrainable when the piece of bone is removed, may yet, in the act of perforation, considerably embarrass and perplex a young operator: it will therefore behove him, in general, to avoid comprehending the suture within his saw; but still it is right that he should know, that, when particular circumstances render it absolutely necessary, such thing may be done very consistently with his patient's safety. Not only a part of the sagittal suture, covering the longitudinal sinus, may be removed with a trephine, if necessary, and no hazard be incurred from the breach of the attaching vessels; but a wound of the sinus itself is by no means *necessarily* attended with an unrestrainable or fatal hæmorrhage.

The very writers themselves, who are so apprehensive of a wound of this part, forget the relations they every now and then give us of fragments of broken bone safely extracted from it.

A mistake concerning the nature of the sinuses was (I suppose) the foundation of these apprehensions. The idea which most of our ancestors had of the motion of the dura mater induced them to believe, that, as the sinuses were composed of this membrane, a wound made in them, like a wound in an arterial tube, could hardly re-unite. It is now universally known that they are merely venal, and that there is no such impediment to the immediate coalescence of a wound in them, when it may happen to be accidentally inflicted.

CASE XXVII.

A BOY, about eight years old, the son of a Jew merchant in the city, received a blow on his head with a stick from his tutor.

The stroke made him giddy for a few minutes; but as no blood was shed, and the pain soon ceased, he concealed it till it was discovered by his barber that his head was swollen in that part. In the middle of the top of his head was a tumor, about the size of a common walnut: it was indolent, had a dull kind of pulsation, and palpably contained a fluid.

Mr. Serjeant Amyand and Mr. Shipton were joined with me. In their presence I divided the tumor with a knife, and let out a quantity of fluid venal blood. When as much had been discharged as the tumor might be supposed to have contained, we were surprised to find the blood still continue to flow, plainly not from the wounded scalp, but from the bottom of the cavity.

Upon examination, it was found that the sagittal suture was broken, that a portion of the fracture was forced into the sinus, and that the blood issued by the sides of this fragment.

Extraction of this fragment was attempted, but to no purpose. By the direction of the consultants, I made a small perforation on one side of the suture; but when that was done, the point of the elevator could not be so introduced as to get the broken piece out. The trephine was then applied on the other side of the suture, and to the same effect, or rather no effect. The fragment was only capable of being extracted as it had gone in. At last, after much deliberation and conversation about the hazard of wounding a sinus, (which was indeed already wounded by the broken bone,) it was agreed to set a trephine on the suture, in such manner that the whole surface should be comprehended within its circle. This was done; but when the elevator was applied, the piece sawed came out in fragments, and left the one portion which had pierced the sinus still sticking in it. We were then necessitated to lay hold of it, and extract it with a pair of forceps. A flux of blood followed, but, by the application of a small dossil of dry lint, held on for a few minutes, it ceased, and never recurred. The patient is alive at the time of my writing this.

CASE XXVIII.

A GIRL about sixteen was knocked down by her mother with an iron poker of considerable weight; the latter immediately ran

away, and the former was brought senseless to the hospital. She had a large wound on the top of her head, with a considerable fracture of the sagittal suture. The broken pieces were so large, and so loose, as to be easily removeable without any perforation. When they were taken away, the longitudinal sinus was left bare, at least two inches in length; but no hæmorrhage followed the removal of the fragments.

For three days she was bled twice a day, from one part or other of her, and stools were procured in such manner as was possible, but to no purpose; she still remained perfectly and absolutely senseless. On the fifth day, finding her still in the same state, and verily believing that nothing in art could at all serve her, I made an opening with a lancet into the longitudinal sinus, and suffered the blood to run off, until her countenance, which was much flushed, became pale, and her pulse, which till now had been full and strong, though labouring, faltered considerably; in short, till she shewed as much as a senseless person could the marks of a deliquium from inanition. I then put a bit of lint on the orifice, and ordered the nurse to keep her finger lightly on it until I had visited the rest of the house. When I returned, the part shewed no disposition to bleed again, nor did it ever after. That afternoon she opened her eyes and moved her arms, and the next morning was sensible enough to ask for drink. She retained her senses for several days, but a fever coming on, she became delirious and convulsed, and died so on the seventeenth day from that of her admission into the hospital.

Upon examination, after death, a considerable abscess was found on the surface of the brain, on one side of the falciform process of the dura mater.

I should be very sorry to be so misunderstood, as to have it conceived that I have related these cases with a view to encourage the opening of a longitudinal sinus; that is far from my intention. I only mean, by adducing these instances, to prove that our fears of irremediable mischief from such wounds, whether accidentally or artificially inflicted, are not well grounded; and that we may, in some desperate cases, have recourse to such means as have been supposed to be either impracticable or unwarrantable. A surgeon

should ever be cautious; but ill-grounded apprehensions will necessarily prevent improvements, and hinder us in some cases from attempting what may prove beneficial to mankind. Had every successor to Hippocrates been of his opinion, the operation of lithotomy had never arrived at its present state of perfection, and mankind had been suffered to languish under, and be destroyed by, a most tedious as well as excruciating malady.

SECT. V.

FRACTURES OF THE CRANIUM WITH DEPRESSION.

Simple fractures of the scull, or those in which the parts of the broken bone are not depressed from their situation, differ from what are called fissures, only in the distance of the edges of breach from each other. When the separation is considerable it is called a fracture, when it is very fine and small it is called a fissure. The chirurgical intention and requisite treatment are the same in each, viz. to procure a discharge for any fluid which may be extravasated in present, and to guard against the formation or confinement of matter in future. But in fractures attended with depression, the intentions are more. In these, the depressed parts to be elevated, and such as are so separated as to be incapable of reunion, or of being brought to lie properly and without pressing on the brain, are to be totally removed.

These circumstances are peculiar to a depressed fracture; but although they are peculiar, they must not be considered as sole, but as additional to all those which have been mentioned at large under the head of simple fracture: commotion, extravasation, inflammation, suppuration, and every ill which can attend on or be found in the latter, are to be met with in the former; and will require the same method of treatment.

To free the brain from pressure, and to provide a free discharge for blood or lymph at present, or for matter in future, by elevating

the depressed pieces, and by removing such as were loose, was as well known to the ancients to be the proper curative intentions, as they can be to us; but the means which they made use of in order to accomplish these ends were somewhat different to what are now used; and laboured under some inconveniences which later practitioners have corrected. This difference it may be worth while to inquire into.

Most of the attempts made by our ancestors, for the elevation of depressed parts of the cranium, were made by the application of instruments to the parts so depressed. This was a palpable imperfection, to say no more of it; but this was not all; for the instruments which they made use of on these occasions were not only to be fastened to the depressed part of the bone, but required also some degree of force to be used in fastening them to such part. The troclea tripes, the troclea bipes, and all the pieces of machinery designed by Albucasis, Guido, Andreas a Cruce, Fabritius ab Aquapendente, Pare, and Scultetus, as well as those delineated by Hildanus and Peter Paaw, are proofs of this: they all require a perforation to be made in the depressed piece, either by or for the screw with which it is to be elevated. Now, not to mention that most of these instruments were so complex as to render them extremely awkward and unmanageable, it is obvious, that, by the application of any of them to the depressed pieces, (especially if they were loose,) all the ills arising from pressure made on the parts underneath must be increased; and that in many cases they could not be used at all. Celsus has indeed directed the meningophylax to be used as an elevator; which instrument differs but little from the elevator used at present, either in form or manner of application; but then the opening through which it is to be introduced is to be made either with the terebra or the cycliscos, the inconveniences of which have already been remarked. In short, all the objections which the old perforating instruments were liable to in simple undepressed fractures being of still greater force in fractures with depression, and the application of any kind of instrument whatever to the outer surface of a depressed or loose piece of scull being palpably wrong, and liable to hazard, the present practitioners are certainly vindicable in having laid them all aside, and in having endeavoured

to accomplish the same end by means which are less hazardous and less operose. The trephine is (as I have before observed) the only perforating instrument used by the best of the present practitioners in England:[u] with this, an opening is made in the sound undepressed part of the cranium, and through such opening an instrument, called from its use an elevator, is introduced. This perforation should either comprehend the border of the fracture, where that is possible, or if that cannot be conveniently done, should be made as near to it as possible, for reasons too obvious to need recital. What number of perforations may be necessary can only be determined by the particular circumstances of each individual case: all the intentions which may arise from extravasation of fluid, or probability of suppuration, as well as those from the depression of bone, must be fulfilled, or the work will be left imperfect, and little chance of good will attend it.

When the whole disease seems to consist in the mere depression of the bone, and what symptoms attend seem to proceed from that alone, the elevation of such portion may procure immediate remission of such symptoms, and afford a reasonable prospect of success. But as the injury is not always of so simple a nature, as other parts are so frequently hurt and other mischief done by such great violence, the remission, or disappearance of such symptoms as arise merely from such pressure, cannot be a sufficient warrant, either for promising or for expecting success. The dura mater under the depressed piece, or even in another part of the head, may have been so hurt as to become inflamed, and to suppurate: the symptoms of which will not appear immediately, nor in general until some time is past: but however late they may come on, they will not therefore be the less certain or the less hazardous. The early attack of those which are caused by extravasated fluid or depressed bone, does by no means

[u] M. Savigny, in his work on Chirurgical Instruments, has exhibited a trephine on a new and improved construction, which is divested of lateral teeth, and made on the same principles as the amputating saw; it certainly performs its office with celerity and neatness, and with less exertion to the operator than that before in use. The perforator having sufficiently fixed the saw in the circle, is by a contrivance made to retire, which precludes the necessity of removing it by means of a key. E.

preclude the later accession of such as arise from inflammation and putrefaction. The depressed piece of bone does most certainly require our immediate help, but the assistance lent to that, however proper and effectual, does not render it at all less necessary to guard against such ill as may most reasonably be expected to proceed from violence sustained by the parts underneath. A blow, which has been sufficient to break and depress a portion of the scull, very frequently does such damage to the tender vessels which communicate between that bone and the meninges, as to be the cause of much more, as well as greater ill, than what is deducible from the mere fracture; and consequently, although the elevation of the bone is *one* very necessary part of a surgeon's business in these cases, yet it is very far from being *all* that he has to do. All the ills which may be apprehended from every other possible effect of such violences, are to be feared and guarded against, and that full as much in the fracture with depression as in that without.

This is a part of practice which ought to be very carefully attended to. The generality of writers have contented themselves with directing us to raise up the depressed parts, and thereby to endeavour to remove such symptoms as are caused by the mere pressure which the bone makes on the brain; but have either totally neglected, or very slightly passed over, what is of full as much consequence to the patient; I mean the injury which is most frequently done to the membranes of the brain, and which, if neglected, will certainly produce that fever, and those symptoms, which so often baffle the whole power of medicine.

The combination of different ill effects, proceeding from the same primary violence, and concurring in the same subject, together with the great difficulty of distinguishing them from each other, is one of the principal causes of that perplexing uncertainty attending wounds of the head. When one cause of bad symptoms has been removed, another, or even several others, may still remain, each of which singly may be sufficient to destroy the patient; and therefore, although the means first made use of may have been such as have been pointed out by the earliest and most alarming symptoms, and extremely proper for the relief of such complaint, had it been the only one the patient laboured under,

yet in the case of a complication, by not being sufficient to answer every requisite intention, they very often answer none, at least not effectually; and producing only a temporary and partial relief, prove a greater aggravation of our disappointment.

This every practitioner should know, and this the friends of every patient should be made acquainted with, lest the former, being deceived by an appearance of amendment, be induced to promise what it will not be in his power to perform; and the latter, having had their hopes exalted, should be the more severely hurt by their disappointment.

If the fracture be but small, the depression little, and the force with which it was produced not great, the elevator introduced through the perforation may be sufficient to set it to rights; and if there be no urgent symptoms, nor any mischief done to the internal parts, may be sufficient for all purposes. But if the force was great, if the symptoms are immediate and pressing, if the fracture runs in a form inclined to a circular one, or if the depressed piece be cracked all round, the best and safest way is to remove the whole, or greater part, of the portion so depressed or circumscribed.

To those who are unused to things of this sort, so large an opening as such method of acting must make will have a very tremendous appearance; and they may be inclined to suspect much hazard and inconvenience from laying bare so large a portion of the dura mater; but let all such remember, that however large the quantity of membrane may be which shall be thus denuded by the operation, yet the same quantity at least, most probably a much larger, would, in all likelihood, become inflamed, and generate matter on its surface; which matter, for want of a timely, ready, and sufficient outlet, would do considerably more mischief than the mere detection of the said membrane can do.

In cases where the broken pieces of a depressed fracture are widely separated from each other, and some of them a good deal loosened, the expediency and the propriety of removing such pieces are acknowledged by every body; but few people attend to the reason, or inquire why such practice is just and proper; if they did, they would also see that the free removal of bone was equally

proper in the case of great violence, as in that of loosened or widely separated pieces. In the latter the broken parts are removed, because their reunion with the rest of the cranium, and the preservation of the attachment of the dura mater to the inner surface of them, is thought impossible, or at least highly improbable; and that therefore they must be in the way, and hinder the free discharge of matter from the suppurating membrane. And is not the same inconvenience full as likely to attend the former? Is it the violence done to the bone, and through it to the membrane, which causes the inflammation and suppuration? Or is it the loosened or separated state of the broken part? If it be the former, (as it most undoubtedly must be,) the same precautions, the same method of treatment must be equally necessary in the one as in the other; the reasons, the intentions, are the same in each; and if the conduct be not the same the patient will suffer.

The peculiar circumstances of each individual case must furnish direction to the practitioner for his particular conduct. Rules to be laid down by a writer on such subject can be only general. The parts which are depressed must be elevated; such as are loose and cannot be brought to lie even, such as cannot be prevented from pressing on the membrane, or such as wound and irritate it, must at all events be taken away; the free discharge of blood or lymph in present, and of matter in future, must be provided for; and therefore every symptom and appearance must carefully and early be attended to, lest the most proper opportunity of giving assistance be not embraced.

The circumstances just mentioned are such as cannot be neglected but at the risk of the patient; and therefore the prohibitions which our forefathers have delivered down to us, with regard to the parts of the scull on which they say we ought not at any rate to apply our perforating instruments, must be received with some limitation.

The places forbidden as improper are, the sutures, the lower part of the os occipitale, the ossa temporum, and that part of the os frontale where the sinuses are situated.

That a trephine may without hazard be applied on a suture, I have already said. When it may with equal utility be set on any other part, the sutures should undoubtedly be avoided, and that

for a good reason, exclusive of any peculiar hazard: but that part of a suture may (the case requiring it) be safely removed, is true beyond all doubt. That many of the old practitioners were very apprehensive of mischief from hence, is not to be wondered at by any body who considers their idea of the nature of the subjacent sinuses, and the strange unmanageable instruments with which they operated. Not that there are wanting old writers who have held the doctrine of operating on a suture, when necessary, very defensible; among whom is J. Baptist. Cortesius.

Perforation of the temporal bones has been forbid, both on account of the artery and the muscle which are on its surface; unrestrainable hæmorrhage having been dreaded from the one, and fatal convulsion from the other: but, experience may convince us, that neither of these apprehensions is strictly just. The temporal artery, when divided, is often capable of being restrained by compression, and always by ligature; and that fatal convulsion, which is vulgarly called the lock-jaw, though it produces one of its most striking and most visible effects on these muscles, is not necessarily produced by a wound of either of them, more than by a wound of any other. In short, the upper part of the temporal bones may be laid bare, if necessary, by an incision made through the muscles covering them; and may also be perforated. Such operation does not indeed often prove successful; but the failure of success does not proceed from the nature of the parts operated upon, but from a circumstance of much more consequence, and generally without remedy; which is, that in these fractures the breach is most commonly continued on to the basis of the scull, and is also most frequently attended by a large extravasation within or under the brain and cerebellum.[x]

When the depressed parts have been raised up, the loose ones removed, extravasated fluid discharged, the brain freed from pressure, and way made for the free exit of whatever may be formed or collected, the bare dura mater should be dressed as easily and

[x] Whoever will examine the disposition of the temporal muscle will see, that its aponeurosis covers a very considerable part of the inferior border of the os parietale; and, consequently, that such part of the bone can never be laid bare without a division or removal of a part of the said aponeurotic expansion.

lightly as possible. Our ancestors had a multiplicity of medicaments, which they used upon these occasions, and were very precise in suiting them to the different states (as they called them) of the sore and membrane. They were also very exact in making and applying those pieces of linen or of silk, called sindons, which they used to imbue with the said remedies, and dress the bare dura mater with. I have taken no notice of either, because I verily believe that the majority of the former were absolutely useless, and that the very exact application of the latter was prejudicial, by confining, in some degree, what ought to be discharged with the utmost freedom.

Wounds of the brain, among writers on this subject, have also generally made a distinct chapter; but the treatment of them is so very little different from those which have been already related, that they may fairly be comprehended under the same article.

The brain is wounded either by the instrument, or body whereby the scull is broken, or by broken parts of the cranium; foreign bodies also, such as bullets, splinters, parts of weapons, wadding of fire-arms, &c., are sometimes lodged in it; but let the wound or fracture be what it may, or whatever other circumstances may happen to attend, the chirurgic treatment is short and plain; viz. to remove all such parts of the broken scull, as may press, wound, or irritate the brain or its membranes; to take away all such extraneous bodies, as can easily, and without violence, be got at and extracted; and to make such an opening as may most conveniently serve the purpose of discharging blood, serum, or matter, either in present or in future. When all these things have been done, and the patient has been put under a proper regimen, both of diet and medicine, the surgeon has done his duty, and may say with Mr. Pope—

"Thus far was right; the rest we leave to heaven."

For with regard to the dressings proper in these cases, they are not at all different from those which ought to be used, where neither the brain nor its meninges are hurt. They should be soft, light, and not consist of any thing greasy, or which can possibly

irritate or inflame; nor should they be applied in such manner or quantity as to press or obstruct the free discharge of fluids of any kind. Soft dry lint is perhaps equal to any or all others. In the chirurgical writers are to be found a great many formulæ: but, whoever places confidence in them, for any supposed merit of their own, will find himself much disappointed.

I cannot quit this subject, without making a short remark on the bandages most frequently advised, and used in wounds of the head.

In all the writers on the subject of fasciæ are to be found descriptions and delineations of those which are said to be most proper for the head. On paper they are neat and elegant, in the application they require a small degree of practice and dexterity, and, when applied nicely, may impose on the ignorant, and on those who have not seen much of, or reflected much on, their inconvenience. They press, heat, and painfully confine the head, even when applied in the best and most ingenious manner; and, when put on awkwardly or negligently, are still more troublesome, and less serviceable. All that can ever possibly be wanted in these cases from bandage must be, merely to keep the dressings in their place without any degree of confinement or pressure; and this purpose will always be better accomplished by a loose cotton or yarn night-cap, than by the nicest and most elaborate bandage that ever was invented.[y]

[y] "On this subject I was very glad to find so very good a judge as Oribasius of the same opinion.

"Hæc autem omnia non fasciis continentur, propter pondus, sed velamento, "ut cohibeantur, neque cerebri membrana gravatur; ac velamenti media "pars, quæ terebrato respondet, forfice exciditur, ut apertum fiat, atque in "illud spatium cana mollis, in extremis constricta, duplex inditur," &c.

"Plerique omnes non alia vinctura terebratos deligant; sed sola redemi-"culi circumductione contenti sint. Quinetiam ipsa quoque ulcera extra "terebrationem, quoad fieri potest, conari debemus sine fasciis curare; non "modo quia gravantur compressis iis quæ sub vinculis imposita ipsis fuerant, "verum etiam quia plus quam par est califaciunt. Etenim quod in aliis par-"tibus vinctura, id in capite positio præstabit, ideo deligare supervacaneum "erit."

ORIBASIUS *De fract. ex Heliodoro.*

CASE XXIX.

A GIRL, about fifteen years old, crossing Smithfield on a market-day, was tossed by an ox, and fell with her head on the flat stones within the posts. As her dress was mean, and nobody knew any thing of her, she was brought senseless into the hospital. She had a large bruise on the right side of her head, through which I plainly felt a fracture with depression. The scalp being removed from that part, the fracture was found to be large, and the depression considerable: it traversed the os parietale from before backward, in its middle part between the sagittal and temporal sutures, and the depression was of the upper part of the bone. I applied a trephine on the inferior and undepressed part, and by means of an elevator raised the whole to a perfect equality. Her head was dressed lightly, and sixteen ounces of blood were taken from her. She passed the following night very unquietly, and the next morning was still senseless. She was again freely bled, and a purge was given, which soon operated. On the third day, her pulse admitting, and her circumstances requiring it, she was bled again. On the fourth day she became sensible, and on the fifth was surprisingly well. She remained so until the ninth, on the evening of which she complained of head-ach, sickness, and giddiness. She was again let blood, and put under the direction of the physician, who ordered some medicines for her. From the ninth to the thirteenth day, she remained much the same; that is to say, feverish, and complaining of heat, thirst, head-ach, and watching. On the fourteenth she had a severe rigor, and the sore on the scalp as well as the denuded dura mater wore a very bad aspect. From this time she became daily worse and worse, in every respect; and on the twentieth day from that of the accident, she died, having been terribly shaken by spasms for several hours.

All the internal surface of the os parietale above the fracture was detached from the dura mater, and covered with matter, which could not obtain free discharge at the perforation, the membrane being inflamed and thrust up tight against it.

I will not pretend to assert, that repeated perforation of the upper part of the bone would have preserved her; but I must say,

as the case turned out, it would have been her best, if not her only chance; and that, if I had known at that time as much of these cases as I think I have since learned, I should certainly have taken away the greatest part, if not the whole of what had been depressed.

CASE XXX.

A GENTLEMAN's servant, riding carelessly and hastily through London, was thrown from his horse, and struck his forehead against a sharp stone. There was a considerable wound on the scalp, and a fracture, with depression of the os frontale. The man was perfectly deprived of sense, the bone was considerably depressed, and a large quantity of blood issued from underneath the depressed part. A trephine was applied on the undepressed part, and the elevation accomplished; he was let blood freely, and dressed lightly. On the second and third days he was let blood again. On the fourth he recovered his senses, and from that day to the ninth seemed to go on well. On the ninth in the evening he complained of pain and lassitude, and was ill that night and all the next day. On the eleventh he was worse, and (to use his own words) said, his brains were bound round with a fillet, like a collar of brawn. His pulse was hard, frequent, and jarring, his skin hot, and he got no sleep at all. As the man was evidently and hastily getting into a hazardous state, I was determined to try what a free removal of bone would do; and with a large trephine took away almost the whole of what had been depressed. The dura mater was not purulent, but dull in colour, and smeared over with what Morgagni says is gelatinis instar.

He was again and again let blood, as his pulse would bear, and the physician ordered proper medicines for him. For four days from this time he continued much the same, but after that every thing changed for the better; he took the cortex freely, and in about three months was discharged well.

As I would not pretend to assert, that removal of more bone would have proved successful in the preceding case, so neither will I say that the recovery of this man was owing to it. I can

only say, I verily believe both, and that I am sorry I did not make the same experiment in both. The cases were materially similar; and the analogical is the only method we have of reasoning on subjects like this, wherein we cannot have demonstration.

CASE XXXI.

A boy, about fourteen years old, following a led horse, was desired by the servant, in whose hand the horse was, to strike him; the boy did so, and received a blow from one of the horse's heels, which brought him to the ground senseless. He had on the upper and middle part of his forehead a large wound, which disclosed a considerable fracture, with depression.

The fracture ran nearly in a transverse direction across the bone, and the depression was of the upper part. A trephine was applied, an elevator introduced, and the depressed part of the bone with some difficulty made to lie even. The head was dressed lightly, and the boy was let blood largely. He continued senseless all that night, was let blood twice the next day, and had a purge and a clyster. On the fourth day he showed some signs of sense; and in two more, being again let blood and kept very low, was quite sensible. From this day until the fourteenth, every circumstance was promising, but on that day he again became ill; his pulse from this time was hard and quick, and, in short, he had for three or four days all the symptoms of mischief under the cranium. On the nineteenth I made a large perforation in that part of the bone which had been depressed and elevated, and gave discharge to a very large quantity of offensive matter. On the twenty-second he became delirious and convulsed, and on the twenty-third he died.

I removed all the upper part of the cranium, and found the dura mater altered in colour, and separated from the whole frontal bone, from the fracture quite up to the sagittal suture; and under the said membrane, matter to the quantity of about half an ounce.

CASE XXXII.

The following case was sent me by a very ingenious practitioner at some distance from London, and may, among others of like sort, serve to prove that it is not merely the formation of matter between the scull and dura mater, but also the confinement of it there, which are the joint causes of the bad symptoms, and of the hazard.

A boy fell from a cart loaded high with hay, and pitched perpendicularly on his head. The blow stunned him for a few minutes, but he soon got up again, said he was not hurt, and walked home with the cart.

As he made no complaint at home, his master took no farther notice of his fall, and the boy followed his daily labour in the farm-yard.

At the end of a fortnight he came to my friend, and desired him to look at the swelling on the upper part of the right side of his head. The tumor appeared to be full of matter, and the surgeon divided the scalp, and let out a considerable quantity. He passed his finger in, in order to examine whether the cranium was bare or not, and was not a little astonished to find it not only bare but considerably broken. He removed the tumid portion of the scalp; and having so done, found the distinct pieces of bone so loose as to be taken away without any resistance, and so large as together to make nearly a third part of the parietal bone. The dura mater under them was clean, and well incarned.

The boy had no one bad symptom from first to last, came to the surgeon's house every day to be dressed, and was also in the farm-yard daily.

SECT. VI.

EXTRAVASATION AND COMMOTION.

Great and hazardous as the evils are which proceed from fractures of the scull, they do not exceed those which are caused either by the extravasation of fluids within its cavity, or by the concussion or derangement of the substance of the brain; whether we regard the difficulty under which a practitioner labours in forming a judgment of the true nature of the case, or the uncertainty, or the frequent fatality of the event.

The shock which the head sometimes receives by falls from on high, or by strokes from ponderous bodies, does not infrequently cause a breach in some of the vessels, either of the brain or its meninges; and thereby occasions extravasation of the fluid, which should circulate through them. This extravasation may be the only complaint produced by the accident; or it may be joined with, or added to, a fracture of the scull. But this is not all; for it may be produced not only when the cranium is unhurt by the blow, but even when no violence of any kind has been offered to, or received by the head.

Vertigo, vomiting, stupidity, hæmorrhage, loss of sense and motion, either partial or total, are the symptoms of this kind of mischief; sometimes one, or more, sometimes all, in the same subject. These symptoms, which are all easily accountable for from extravasation of fluid, and unnatural pressure made on the brain and nerves, are, as I have already at large remarked, frequently mistaken as indications of a disease which, considered abstractedly, can never cause them; I mean a simple undepressed fracture of the cranium: it may be accompanied by them, but cannot cause them.

When a fluid is extravasated in any considerable quantity within the cavity of the cranium, if any bad symptoms are produced by it at all, they are, and must be, such as indicate pressure made on the brain and origin of the nerves; occasioning thereby

either disturbance or abolition of the offices of sense and motion; and this in different degree, according to the quantity, kind, and situation of the pressing fluid; and to these is sometimes added hæmorrhage from the nose or ears. Thus far, I think, we may pronounce positively; but, to our very frequent mortification, we find these are the only circumstances which in such case we can depend upon, every thing else which relates or belongs to them being involved in a most perplexing obscurity. We not only have no certain infallible rule whereby to distinguish what the pressing fluid is, or where it is situated, but we are in many instances absolutely incapable of knowing whether the symptoms be occasioned by any fluid at all; for a fragment of bone, broken off from the internal table of the cranium, and making an equal degree of pressure, will produce exactly the same complaints.

Sometimes, indeed, the case is otherwise; and, from concomitant appearances, the true nature of the disease may with some degree of certainty be known; but this does not happen very often.

Many of our ancestors, when no fracture was discoverable in the cranium of a person labouring under such symptoms as have been mentioned, in consequence of violence offered to the head, contented themselves with calling the case a concussion; and although they had no very precise idea annexed to the term, yet they seldom went farther for a solution; like teeth and worms in infants, or like nerves in women, it satisfied ignorant inquirers. The cranium was not broken, the mischief was out of sight, most probably out of reach, and they had not often the curiosity or the anatomical judgment to examine after death into the real state of the case.

That a concussion or commotion of the substance of the brain is a circumstance which frequently happens, is a truth beyond all doubt; and that it is often the cause of death, is as true; but that many of the cases which, the scull being found not broken, have passed for concussions, have been really produced by very different causes, has often been incontestibly proved by the examination of such persons' heads after death; where such extravasation of blood or lymph, or both, have been found, as would fairly and rationally account, both for the symptoms and for the event.

A concussion and an extravasation are very distinct causes of mischief, though not always very distinguishable.

M. Le Dran, and others of the modern French writers, have made a very sensible and just distinction between that kind and degree of loss of sense which arises from a mere commotion of the brain, and that which is caused by a mere extravasation, in those instances in which the time of the attack or appearance of such symptoms is different or distinct. The loss of sense, which immediately follows the violence, say they, is most probably owing to a commotion; but that which comes on after an interval of time has passed, is most probably caused by extravasation.

This distinction is certainly just and good, as far as it will go. That degree of abolition or diminution of sense, which immediately attends or follows the blow or fall, and goes off again without the assistance of art, is in all probability occasioned by the sudden shake or temporary derangement of the contents of the head; and the same kind of symptoms recurring again some time after they had ceased, or not coming on until some time has passed from the receipt of the violence, do most probably proceed from the breach of a vessel within or upon the brain. But unluckily we have it not very often in our power to make this exact distinction. An extravasation is often made so immediately, and so largely, at the instant of the accident, that all sense and motion are instantaneously lost, and never again return And it also sometimes happens, that although an extravasation may possibly not have been made at the moment of the accident, and the first complaints may have been owing to commotion merely, yet a quantity of fluid having been shed from its proper vessels very soon after the accident, and producing its proper symptoms, before those caused by the commotion have had time to go off, the similarity of the effects of each of these different causes is such, as to deprive us of all power of distinguishing between the one and the other, or of determining with any tolerable precision to which of them such symptoms as remain are really owing.

When an extravasation of any kind is made, either upon or within the brain, if it be in such quantity, or so situated, as to disorder the economy of the animal, it always produces such disorder, by making an unnatural pressure on the parts where it lies.

The nature and degree of the symptoms hereby produced are various and different in different persons, according to the kind, quantity, and situation of the pressing fluid. Sometimes it is mere fluid blood, sometimes blood in a state of coagulation; sometimes it is a clear lymph, and at others blood and water are found mixed together: each of these is found either simple or mixed in different situations; that is, between the scull and dura mater, between the dura and pia mater, or in the natural cavities of the brain called its ventricles, and sometimes in cases of great violence, they are found at the same time in all these different parts. Sometimes a considerable quantity is shed instantly, at the time of the accident; and sometimes the breach by which the effusion is made is so circumstanced, both as to nature and situation, that it is at first very small, and increases by faster or slower degrees. In the former, the symptoms are generally immediate and urgent, and the extravasation is of the bloody kind; in the latter, they are frequently slight at first, appear after some litttle interval of time, increase gradually till they become urgent or fatal, and are in such case generally occasioned by extravasated lymph. So that although the immediate appearance of bad symptoms does most certainly imply mischief of some kind or other, yet, on the other hand, no man ought to suppose his patient free from hazard, either because such symptoms do not show themselves at first, or because they appear to be but slight: they which come on late, or appearing slight at first increase gradually, being full as much to be dreaded, as to consequence, as the more immediately alarming ones; with this material difference between them, that the one *may* be the consequence of a mere concussion of the brain, and may by means of quietude and evacuation go quite off; whereas, the other being most frequently owing to an extravasation of lymph (though sometimes of blood also) within the substance of the brain, are very seldom removed by art.

Extravasations of any kind, and wherever situated within the cranium, are very hazardous, and much more frequently end fatally than happily; but considered as relative to the art of surgery, that which consists of merely fluid blood situated between the cranium and dura mater is certainly the best, as it is the nearest to the surface, and admits the greatest probability of being relieved

by perforation of the scull: grumous or coagulated blood, although in the same situation, by being most frequently adhering to the membrane, is not so readily discharged as the preceding, and therefore more likely to prove destructive: and all those which are either under the meninges, or within the cavities or substance of the brain, as they are seldom within our exact knowledge, so they are also generally beyond the reach of our art.

The method of treating people under these unhappy circumstances is somewhat different, according to the supposed or most probable nature of the complaint, and according to the symptoms and appearances which it produces, or which accompany it. When the symptoms which imply a pressure made on the brain or nerves have been occasioned merely by a shake or concussion, and neither blow nor other external violence has been offered to or received by the head, we have no rule whereby to form any other than a general opinion; no mark which can point out to us, either the precise nature of the disease, or its particular situation; consequently, we have no direction from what part of the head to remove the scalp, or where to apply a perforating instrument, and therefore no warrant for perforating at all. In this case, the only chance of relief is from phlebotomy and aperients; by which we may hope so to lessen the quantity of the circulating fluids, as to assist nature in the dissipation or absorption of what has been extravasated. This is an effect, which, although not highly improbable in itself, yet is not to be expected from a slight or trifling application of the means proposed. The use of them must be proportioned to the hazard of the case. Blood must be drawn off freely and repeatedly, and from different veins; the belly must be kept constantly open, the body quiet, and the strictest regularity of general regimen must be rigidly observed. By these means, very alarming symptoms have now and then been removed, and people in seemingly very hazardous circumstances have been recovered. Instances of these successes are not indeed so frequent as we could wish, but they have been sufficiently so to warrant the attempt, especially in cases where there are no indications to authorise the use of any other. But when the symptoms of extravasation are the consequence of such external violence as leaves a mark where it

was inflicted, and when the scalp is so bruised or wounded as to shew the place where, we then have some degree of assistance, both in forming a judgment of the most probable nature of the complaint, and in using the means most likely to prove successful in its relief. For if the effusion has been the consequence of the stroke which the head has received, and such effusion is made immediately under the part so stricken, the perforation of the cranium in this place may give discharge to the extravasated fluid; and the wound or bruise in the scalp shows us the point from whence we ought to remove a portion of it, in order to perforate the cranium. This I say is sometimes the case, and the consequence is sometimes so fortunate that we save a perishing patient. But, although it does now and then happen that we succeed, yet such success is by no means certain or to be depended upon. Every thing relative to this kind of disorder is fallible and uncertain; and though the extravasation be sometimes found immediately under the external mark, yet it often happens that it is not, and that the effusion is made in a part distant from that mark, and to which we have nothing to lead us. Upon the whole, although a bruise or wound of the scalp does not in these cases necessarily or certainly point out the seat of an extravasation, yet when bad symptoms urge, and evacuation has been fully and unsuccessfully tried, such mark may be deemed a sufficient though not unerring authority for making farther inquiry, by removing the scalp and perforating the cranium: for this is a kind of case in which we are not to expect certainty, and in which we must be content with such information as we can obtain. The opportunities which we have of being serviceable are but few; we should therefore suffer none to escape, but embrace even possibility. The general advice given by Fabritius ab Aquapendente[z] is applicable to no part of surgery more than to this; in which the loss of a very short space of time is often absolutely irretrievable.

If the extravasation be of blood, and that blood be in a fluid state, small in quantity, and lying between the scull and dura mater, im-

[z] "In vulneribus quæ natura sua admodum periculosa sunt, pessimum est "expectare prava symptomata; et tunc demum providere, cum forsitan "occasio præteriit, nec amplius providere licet." FAB. AB AQUAPENDENTE.

mediately under or near to the place perforated, it may happily be all discharged by such perforation, and the patient's life may thereby be saved; of which many instances are producible. But if the event does not prove so fortunate, if the extravasation be so large or so situated that the operation proves insufficient, yet the symptoms having been urgent, general evacuation having been used ineffectually, and a wound or bruise of the scalp having pointed out the part which most probably received the blow; although the removal of that part of the scalp should not detect any injury done to the bone, yet the symptoms still subsisting, I cannot help thinking, that perforation of the cranium is in these circumstances so fully warranted, that the omission of it may truly be called a neglect of having done that which might have proved serviceable, and, *rebus sic stantibus*, can do no harm. It is very true, that no man can beforehand tell whether such operation will prove beneficial or not, because he cannot know the precise nature, degree, or situation of the mischief; but this uncertainty, properly considered, is so far from being a dissuasive from the attempt, that it is really a strong incitement to make it; it being full as impossible to know that the extravasated fluid does *not* lie between the scull and dura mater, and that under the part stricken, as that it *does;* and if the latter should be the case, and the operation be not performed, one, and most probably the only means of relief, will have been omitted.

Morgagni, in his book De Causis et Sedibus, &c. has treated this subject expressly, and has enumerated all the objections which may be made to the perforation of the cranium, in the case of effusion of fluid within it;[a] but among others he has mentioned a

[a] "Nam ut signa sint, ex quibus liceat suspicari sanguinem intra calvariam "esse effusum, quis scire pro certo possit, an re vera; et si hoc etiam sciret, "in quam partem effusus sit, et quod consequitur, ubi et sit perterebran-"dum," &c.

"Nam pretur unum, qui majorem fortasse exterius dolorem moveat, alia "esse possunt loca, sub quibus majus revera lateat internum vitium.

"In cognoscendo quam fallaces sæpe sint conjecturæ, vel hinc apparet, "quod et si pars ipsa icta, ab ægro indicatur, imo ecchymosi et tumore se "ipsam præclare indicet, non raro tamen casus incidunt, in quibus alia pars "sit contusa, alia in quam effusio facta sit.

"Satis jam superque intelligis casus incidere, in quibus aut nulla, aut tam

popular one, which prevails much among his countrymen; viz. the fear of having been thought to have destroyed those, whom in the nature of things they could not save, "ne sic occisi, qui servari "non potuerant, viderentur." With all possible deference to so able a man, I must say, that this does not seem to me to be by any means a good reason, or one which ought to be formed into a maxim for practitioners: it is founded on the weakness and incapacity of those who pretend to judge of what they do not understand, and therefore should never be embraced through a self-interested principle by those who know better. If such rule were universally admitted, we should often be prevented from embracing a critical opportunity, or using what in many cases is the *unicum remedium*, not only in this disease but in many others. The case of Ptolemy, cited by him from Livy, although brought as a strong corroboration of his own opinion, really can prove nothing, unless it could be made to prove that terebration was the cause of, or at least accelerated, the patient's death; which it can by no means be made to do. No man, who is at all acquainted with this subject, will ever venture to pronounce or promise success from the use of the trephine, even in the most apparently slight cases; he knows that honestly he cannot: it is enough that it has often been successful where and when every other means have failed. The true and just consideration is this: Does the operation of perforating the cranium in such case add at all to that degree of hazard which the patient is in before it is performed? or can he in many instances do well without it? If it does add to the patient's hazard, that is certainly a very good reason for laying it aside, or for using it very cautiously; but if it does not, (which I verily believe,) and the only objection made to it is, that it frequently fails of being successful, surely it cannot be right to disuse that which has often been not only salutary, but the *causa sine qua non* of preservation, merely because it is also often unsuccessful; that is, because it is not infallible.

"levia, inter initia se offerunt, effusi intra cranium sanguinis signa, tot autem, "et tam gravia post longum intervallum confestim se ingerunt, ut neque "primo illo opportuno tempore æger ex timore periculi, ut terebram admit-"tat, neque extremo sperare possent medici, opem se per eam allaturos, tam "longo spatio et tam perniciosis indiciis extantibus."

MORGAGNI *De Causis et Sed. Morbor.*

I should be extremely sorry to say any thing which might mislead my reader, but I cannot help thinking, that, dark and obscure as this part of surgery is, yet there are sometimes appearances and circumstances, which may be said positively to indicate the fitness of the operation, among which I reckon the spontaneous detachment of the pericranium from the scull, in consequence of a heavy blow, attended with symptoms of stupefaction or loss of sense.

Whenever the dura mater is separated from its attachment to the inner surface of the cranium, the pericranium covering the outer part of the same bone is generally detached also. When this separation is produced by the formation of matter, in consequence of inflammation, the tumefaction of the scalp, which denotes this effect, appears some days after the violence has been received, and is always accompanied with a symptomatic fever. The effusion of a considerable quantity of extravasated blood on the surface of the dura mater, as it absolutely separates that membrane from the bone, and cuts off all communication between that part and the scalp, so it does in the same manner oblige the pericranium to quit its attachment to the scull, of which I have remarked frequent instances, and I have also most frequently observed, that the blood in such cases has been coagulated, and very adherent to the membrane. Now if this observation should be found to be most frequently true, that is, if a detachment of the dura mater from within the scull, by means of an extravasation, be found to be most frequently accompanied by a detachment of the pericranium on the outside, have we not thereby an indication both why and where we ought to perforate? The operation *may* not be successful, but desperation cannot be submitted to while there is the most extreme degree of *probability* of being serviceable.

A free discharge by means of it may produce a cure, or it may prove only a temporary relief, according to the different circumstances of different cases: the disappearance or even the alleviation of the most pressing symptoms is undoubtedly a favourable circumstance, but is not to be depended upon as absolutely portending a good event; either a bloody or limpid extravasation may be formed or forming between the meninges, or upon or within the brain, and may prove as certainly pernicious in future as the more external effusion would have done had it not been dis-

charged; or the dura mater may have been so damaged by the violence of the blow as to inflame and suppurate, and thereby destroy the patient. The complaints arising from extravasation, and from suppuration, are (as I have already at large observed) very different and distinct from each other; the former may be relieved, or even totally removed, and the latter not prevented, nor indeed be capable of prevention: of this every practitioner should be aware, lest he expect and promise too much.

The nearer the extravasated fluid lies to the cranium the better; therefore, that which is situated between the scull and dura mater is, cæteris paribus, the most favourable of any. If the disease lies between the dura and pia mater, mere perforation of the scull can do nothing; and therefore, if the symptoms are pressing, there is no remedy but division of the outer of these membranes. The division of the dura mater is an operation which I have several times seen done by others, and have often done myself; I have seen it, and have found it now and then successful; and from those instances of success, am satisfied of the propriety and necessity of its being sometimes done: but let not the practitioner, who has not had frequent opportunity of seeing these kinds of things, presume, from the light manner in which this necessary operation has been spoken of by a few modern writers, that it is a thing of little consequence; for it most certainly is not. Wounds of the membranes of the brain, by whatever body inflicted, or in whatever manner made, have always been deemed, and (which is more to the purpose) have always been found to be hazardous. There is indeed some difference between a wound made by a clean lancet or knife, and one made by bone, bullet, or any thing which bruises or tears: but this relates only to the manner: the part wounded is the same in all; and whether the dura mater be divided by a lancet, or by a fragment of bone, or any other body, it is equally divided, and the air is let in in the same manner on the pia mater, or brain, which become thereby subject to all the ills which such wound, or such exposition, is capable of causing.

Authors, indeed, do every now and then tell us strange stories, and give us strange accounts of incisions made into the meninges and brain in search of foreign bodies, of extravasated fluids, &c.: but let the young practitioner read these relations with some re-

serve of faith, and recollect that the excellent advice given by a very able man, "Homines non admiratione afficere, sed eis utiliora "docere," is not always attended to by writers. Caution and fear are different things; where any good can be done, it ought to be attempted by every practicable and justifiable means; but where no good is reasonably to be expected, there is no warrant for doing any thing. The division of the dura mater I have seen to be necessary, and I have seen it to be successful: but all wounds of it are far from being matters of indifference. Every chance of life is to be embraced, and a good surgeon will never hesitate to execute whatever appears feasible, or even possibly beneficial; but at the same time he will not act without some such kind of warranty as shall prove that his patient's benefit was his one object, and will take care that neither his prognostic nor his conduct shall expose him justly to the censure of being either ignorant, unfeeling, or fool-hardy.

Upon the removal of a piece of bone by means of the trephine, if the operation shall have been performed over the part where the disease is situated, and the extravasation be of the fluid kind, and between the cranium and dura mater, such fluid, whether it be blood, water, or both, is immediately seen, and is partly discharged by such opening: if, on the other hand, the extravasation be of blood in a coagulated or grumous state, it is either loose, or in some degree adherent to the dura mater: if the former of these be the case, it is either totally or partially discharged at the time of or soon after the operation, according to the quantity or extent of the mischief: if the latter, the perforation discovers, but does not immediately discharge it. In both instances, the conduct of the surgeon, with regard to repetition of the operation, must be determined by the particular circumstances of each individual case; a large extravasation must necessarily require a more free removal of bone than a small one; not only on account of freedom of discharge, but on account of larger detachment of dura mater; and a grumous or coagulated extravasation requires a still more free use of the instrument, not only because the blood in such state is discharged with difficulty, but because the whole surface of the dura mater so covered is always put under the necessity of sup-

purating, which suppuration has but one chance of a happy event, and that derivable from the free use of the perforator.

When the extravasation is not between the cranium and dura mater, but either between the meninges, or in the ventricles of the brain, the appearances are not only different from the preceding state of the case, but from each other.

When the extravasated fluid lies between the scull and dura mater, as soon as that extravasation is discharged, or the grumous blood has been wiped off, the dura mater appears flaccid, easily yields to or does not resist the impression of a finger, and (the discharge being made) enjoys that kind of motion, that elevation and depression, which our fathers supposed it to have naturally and always, but which is only the consequence of the circulation through the brain, and the artificial removal of the piece of bone. But when the extravasation is situated between the meninges, or on the surface of the brain, the appearance is not the same. In this case, there is no discharge upon removing the bone; and the dura mater, instead of being flaccid and readily obeying the motion of the blood, appears full and turgid, has little or no motion, and pressing hard against the edges of the perforation, rises into a kind of spheroidal form in the whole of the perforated bone. If the extravasation be of the limpid kind, the membrane retains its natural colour; but if it be either purely fluid blood, or blood coagulated, and the subject young, the colour of the membrane is so altered by what lies under it, that the nature of the case is always determinable from this circumstance.

Be the extravasated fluid what it may, it has no natural outlet; absorption was the only chance the patient had whereby to get rid of it without an operation, and that we must now suppose to have failed; an artificial opening therefore must be made, by the division of the dura mater, and perhaps of the pia also. This operation, under the circumstances and appearances already mentioned, is absolutely necessary, and has been successful: it is performed to give discharge to what cannot be got rid of by any other means, and consists in a division of the membrane or membranes, made in a crucial form with a point of a lancet. The operation in itself is extremely simple and easy, but the patient is thereby put into the state of one whose meninges have been

wounded, with only this difference, that the wound made for this purpose is smooth and simple, and inflicted with the least possible violence; whereas an accidental wound of the same parts may be lacerated, contused, and attended with circumstances which must aggravate the evil, and may induce worse consequences.

Of commotion or concussion of the solid parts of the brain, we have only a negative kind of proof, and therefore are still more in the dark, than we are with regard to extravasation.

Very alarming symptoms, followed sometimes by the most fatal consequences, are found to attend great violences offered to the head; and upon the strictest examination both of the living and the dead, neither fissure, fracture, nor extravasation of any kind, can be discovered. The same symptoms, and the same event, are met with when the head has received no injury at all *ab externo*, but has only been violently shaken; nay, when only the body or general frame has seemed to have sustained the whole violence. It is a commonly received opinion, that a concussion of the brain is always in proportion to the resistance which the cranium makes; that if the latter sustains a considerable degree of fracture, the former is but slightly injured, and that the concussion is greatest when the scull is least hurt. This may sometimes be the case; violent and even fatal commotions of the brain happen when no injury has been done to the scull, and very large and terrible fractures are sometimes unattended with any symptoms of concussion; all this is sometimes true, but the position can by no means be admitted as a general principle, whereon to form our judgment, or whereby to regulate our conduct; experience frequently contradicting it.

The symptoms attending a concussion are generally in proportion to the degree of violence which the brain itself has sustained, and which indeed is cognizable only by the symptoms. If the concussion be very great, all sense and power of motion are immediately abolished, and death follows soon: but between this degree and that slight confusion (or stunning, as it is called) which attends most violences done to the head, there are many stages. Sometimes a concussion produces the same kind of

oppressive symptoms as an extravasation, and the patient is either almost or totally bereft of sense: at other times no such symptoms attend, but the patient gets no sleep at all, has a wild look, an eye much like to that of a person who has long watched through apprehension and anxiety, talks much and very inconsistently, has a hard labouring pulse, some small degree of fever, and sometimes an inclination to vomit: if not retained, the patient will get out of bed, and act with a kind of frantic absurdity, and appears in general much hurt by a strong light. A debility of understanding, an ideot look, a failure of memory, a paralytic affection of some one part or limb, the loss of sense, spasm, resolution or rigidity of some one part or muscle, are often the consequence of it. These complaints are sometimes cured, but some of them do sometimes remain through the rest of life.

To distinguish between an extravasation and a commotion by the symptoms only, is frequently a very difficult matter, sometimes an impossible one. The similarity of the effects in some cases, and the very small space of time which may intervene between the going off of the one and accession of the other, render this a very nice exercise of the judgment. The first stunning or deprivation of sense, whether total or partial, may be from either; and no man can tell from which. But when these first symptoms have been removed, or have spontaneously disappeared; if such patient is again oppressed with drowsiness, or stupidity, or total or partial loss of sense, it then becomes most probable that the first complaints were from commotion, and that the latter are from extravasation; and the greater the distance of time between the two, the greater is the probability not only that an extravasation is the cause, but that the extravasation is of the limpid kind, made *gradatim*, and within the brain.

Whoever seriously reflects on the nature of these two causes of evil within the cranium, and considers them as liable to frequent combination in the same subject, and at the same time considers, that in many instances no degree of information can be obtained from the only person capable of giving it, (the patient,) will immediately be sensible, how very difficult a part a practitioner has to act in many of these cases, and how very unjust it must be to

call that ignorance, which is only a just diffidence arising from the obscurity of the subject, and the impossibility of attaining materials to form a clear judgment.

When there is no reason to apprehend any other injury, and commotion seems to be the sole disease, plentiful evacuation by phlebotomy and lenient cathartics, a dark room, the most perfect quietude, and a very low regimen, are the only means in our power; and are sometimes successful.

Having in the preceding sheets frequently spoken of the trephine, I have only to add, that if such operation be attended with success, that is, if an extravasated fluid be thereby discharged, a depressed bone elevated, matter which had been formed between the scull and dura mater let out, or the inflammatory tension of the membrane prevented, in such manner as to rescue the patient from the danger he was in from such accident; in such cases, I say, that the bare dura mater readily obeys the motion of the blood through the brain, and is freely elevated and depressed; by degrees it loses its bright silver hue, and becomes purulent and sloughy, and then casting off this slough, is covered by a granulation of new flesh, of firm consistence and florid red colour; moderate quantity of good matter is discharged daily, and the new incarnation rises gradually through the perforation, until it gets above the edges of it, when joining with that which either has sprung from the surface of the bare cranium, or which has thrown off from thence a small exfoliation, they together make a firm cicatrix. During all this time the patient is generally free from fever or pain, gets good sleep, has a natural appetite, and seems as near to being in health as his circumstances can permit.

On the other hand, if the mischief be such that all means prove ineffectual, the appearances are very different. The dura mater, instead of casting off a thin slough and incarning kindly, becomes hard, tense, and foul; in a few days it generally thrusts up an ill-natured fungus, which, pressing hard against the edges of the perforation, prevents the discharge from within; the bare bone becomes blackish or deeply yellow, and the edges of the sore in the scalp are painful, loose, flabby, and have no connexion with the bone on which they lie; the discharge is a thin stinking gleet, and

large in quantity; the patient is hot, thirsty, and sleepless; the tongue is black, the pulse hard and quick; sometimes a delirium, and sometimes frequent spasms disorder and shake his whole frame; his countenance is flushed and has a yellow tint, his eyes lose all their natural brightness and seem sunk in their orbits; and his rigors, which were at first slight and few, become more frequent and more severe as his dissolution approaches. A slight degree of these symptoms is sometimes got the better of by proper care and treatment; but if they are far advanced, or run very high, we may use the words of a very excellent writer on this subject, I mean Berengarius Carpensis:[b] *Hic casus est de his, e quibus non evadunt aliqui, nisi nutu dei.*

[b] The sentiments of a very ancient writer on this matter are so very just and apposite, that I hope the reader will excuse the length of the quotation.

"Qui sanescere possunt, vel perituri sunt, ex his conjicere est; plurimum "quidem ex ipso vulnere, deinde et ex reliquo corpore.

"Salubriter se habentium notæ sunt, ulcus non dolens, cerebrique mem- "brana naturalem colorem, ac motum servans, et ulcus post suppurationem "imminui. Pus album, æquale, modice crassum, non male olens. Ulcus quod "initio album apparuit, post aliquod tempus rubescere, carnem milio similem "producere, squamulasque suis temporibus emittere; sine perturbatione "somnum capere; sine febre esse; cibum appetere; assumpta digerere; "æquas excretiones fieri; glandulas, quæ primis diebus apparuerant, aut "erysipelas cito dissolvi.

"Eos qui periclitantur cognoscere licet tum aspectu, tum ex iis quæ "vulneri cæteroque corpori accidunt, et iis quæ excernuntur. Color igitur "plerumque languidus et permanens, periculosus, oculique concavi et ex- "tantes, &c. Ulcus dolere, magis interdiu, retorridum fieri, atque omni ple- "rumque tumore carere, vel saniem mannare tenuem ac male olentem; "orasque sectæ carnis admodum rubrás et flaccidas esse, atque ubi magis "reflexæ sint, tunc abscedere cutem ab osse molestum est, membranamque "vulneratam immobilem esse, exalbidam vel lividam apparere, vel nigram, "vel plurimum inflammatum aut procidentem, purgatamque, iterum sponte "non ob aliqua re externa sordescere."

ORIBASIUS *De Signis.*

"Spem vero certam faciunt, membrana mobilis ac sui coloris, caro in- "crescens rubicunda, facilis motus maxillæ, atque cervicis.

"Mala signa sunt membrana immobilis, nigra vel livida, vel aliter coloris "corrupti, dementia, acris vomitus, nervorum distensio vel resolutio.—Caro "livida, maxillarum atque cervicis rigor."

CELSUS.

CASE XXXIII.

A YOUNG fellow, about twenty-four years old, was thrown by the swing of a crane at the water-side from a window two stories high, and pitched his head on a sugar hogshead. He was taken up senseless, and brought in that state to St. Bartholomew's hospital.

He was immediately let blood freely, and his head being first clean shaved, was very carefully examined, but no external mark of violence was found. Next morning he was bled again, and the same operation was repeated in the evening of that day, and twice in the course of the third. On the fourth day both the temporal arteries were opened, and bled freely. On the fifth day he died, his symptoms not having remitted in the smallest degree. The cranium was perfectly uninjured. The dura mater every where adherent, and no fluid of any kind between it and the scull. Between the dura and pia mater was a considerable quantity of fluid blood, and principally toward the lower part of the brain.

CASE XXXIV.

A HACKNEY coachman was thrown from his box in Holborn, and fell on his head, as it was thought. He became immediately insensible, and was brought so to the hospital. No mark of violence was to be found on any part of his head, and therefore, although his symptoms were such as rendered an extravasation most probable, yet there was no reason for setting on the instrument on any particular part. Every thing was done for him, both by the physician and myself, from which any advantage might reasonably be expected; but on the third day he expired, having never showed any signs of sense.

All the space between the frontal bone and the dura mater was covered with grumous blood, firmly adherent to the latter.

CASE XXXV.

A BRICKLAYER's labourer fell from a high scaffold, broke one arm and one thigh, and was brought to the hospital about two hours afterward in a state of stupidity. When his arm and thigh were put to rights, his head was examined, but no mark of mischief discovered. He was bled freely, and stools procured on each day for four successive days: but he continued in the same state. On the fifth a small tumor arose on the right side of his head. The scalp was removed, and the bone being found bare, it was immediately perforated. The perforation made way for a large discharge of blood which had been contained between the dura mater and scull. On the first and second day from this operation he remained the same; blood was drawn from some part of him on each, and the discharge continued large and free through the opening made in the bone. On the third day from the application of the trephine, he became toward evening somewhat sensible. On the fourth, having taken a laxative medicine, he had a smart purging, which lasted some hours. On the sixth he was quite calm and sensible, but being reduced to a very low state by his free and frequent evacuations, it was thought right to give him the cortex. This agreed well with him, and from this time he had no other difficulty or trouble.

CASE XXXVI.

A BOY, about ten years old, climbing up a ladder, which was set too perpendicularly, fell from an height of more than twenty feet; he lay some time before he was found, and then was carried home perfectly void of sense. In about three hours after the accident I saw him. He lay quite stupid and senseless, now and then vomited, had a hard, full, labouring pulse, and an obstructed respiration. No mark of violence appeared on his head. He was bled freely, and had a stimulating clyster, which procured a free discharge. During three days he was let blood twice a day; on

the fourth, a small degree of tumefaction appeared on the right side of his head near to the sagittal suture; it was not very manifest, neither did it appear to contain any considerable quantity of fluid, but the very desperate circumstances the child was in, induced me to open it, and, finding the scull bare, to perforate. The dura mater was covered with blood, which discharged freely both at the time of the operation, and during all the next day. On the third day from the operation, he was still insensible. A second perforation was made just below the first, and a third on the other side of the suture. Blood was discharged freely from all three. He was dressed lightly, and his pulse being still strong, more blood was drawn from one of the jugulars. The next day he was rather better, but far from sensible. The day following that he recovered his understanding, and could make signs for what he wanted. It was near a week more before he got his speech, but in the end he got perfectly well.

CASE XXXVII.

A BOY between three and four years old, the son of a merchant in my neighbourhood, was at play with his brother on a bed, and fell from thence on a soft bedside carpet. He pitched on his head, and complained immediately of being sick and giddy, but having vomited, was soon after so well that no farther notice was taken of his fall. On the fourth day from this, his sickness and giddiness returned. Dr. Lee was sent for, who, not regarding the fall as having any share in his complaint, gave him an emetic, and ordered him some of those medicines which are called nervous. For the space of five days from this time, he continued to be now and then sick and giddy, and was very unwilling to stir, or be stirred. On the eleventh he complained that he could not see, and that evening had a sort of fit. On the thirteenth his right arm became useless. On the fifteenth he could not stand. From this evening he became stupid; and on the eighteenth expired.

Between the dura and pia mater was a considerable quantity of bloody serum about the basis of the brain.

CASE XXXVIII.

A WOMAN came to my house, complaining that her husband had kicked her down stairs, and had broke her scull. On the back part of her head was a small wound, but the pericranium was not divided, nor was there any reason to suppose the bone to be hurt. For twelve days she remained without any general complaint; but on the thirteenth she began to be giddy and dim-sighted.

I took her into the hospital, where she was taken all possible care of; but she became first paralytic, and then comatose, and so died. The ventricles of the brain were full of extravasated serum, and, near the origin of the medulla oblongata, was a large lump of firmly coagulated blood.

CASE XXXIX.

A CARPENTER's labourer in Blackfriars fell from a scaffold of a considerable height, and in his way down struck a piece of timber, which, following him, hit him on the head. The man fell on his breech. He was brought to the hospital senseless. The mark on his head made by the timber was scarcely visible, and did not imply any mischief underneath. He was freely let blood, and his body emptied by a clyster administered that day. The next day more blood was drawn from one jugular; and the third the same operation repeated. On the fourth he spake, and on the fifth was so sensible as to give an account of the place from whence he fell. On the sixth, seventh, eighth, ninth, tenth, and eleventh, he was free from complaint, except on the two last he was too much inclined to dose. On the twelfth he found some difficulty in pronunciation, and said, that it was with great difficulty that he could keep himself awake. As his pulse would very well bear it, more blood was drawn away by opening the temporal artery, and a blister was applied to his neck. On the fifteenth he could hardly speak at all, and was never awake unless disturbed for that purpose. On the eighteenth he lost the use of his left side, and on the twentieth died.

About the lower part of the brain was found a small quantity of bloody serum, and all the ventricles were filled with a clear lymph.

CASE XL.

A BOY about fifteen was thrown over the head of a horse, who fell down with him in Smithfield. There was on the side of his head a large wound, with a bare parietal bone; and although there was no appearance of fracture, yet the violence having been great, and the boy being perfectly stupid, I immediately perforated the bare bone, suspecting an extravasation on the dura mater. That membrane was perfectly fair and adherent, nor was there any appearance of extravasation either upon or under it. The next day he was still insensible. I examined the membrane again very carefully, in order to see whether there was any sufficient reason for dividing it, but could find none. Blood was drawn from different parts in large quantity, but to no purpose; he lived three days as it were in a deep sleep, and then died. There was no injury done to the scull; no extravasation of either blood or serum, either upon or between the membranes, nor any unnatural appearances in the cavities of the brain: but upon the plexus choroides was a lump of coagulated blood, near as big as half a small chesnut.

In the course of these papers I have more than once said, that although the symptoms arising from pressure made on the brain and nerves, or on the meninges, were uniform and clear, and perfectly distinct from those caused by inflammation, yet that they very seldom indicate what kind of body such pressure was made by; whether blood, water, or bone; and consequently, that though the disorders proceeding from pressure were perfectly distinguishable from those caused by inflammation, yet they were not at all or very seldom so with regard to each other. Some of the immediately preceding cases are proofs with regard to blood and lymph,

and what follow will, I think, in some degree, prove that the symptoms are the same when they are caused by bone, or by blood and bone together.

CASE XLI.

A CHILD about nine years old received a blow from a cricket-bat on the upper part of his forehead, which brought him to the ground, and deprived him of sense. I found him with a considerable tumor on his forehead, and considering the state he was in, would have removed immediately a part of the scalp; but a dabbler in surgery, who was a relation, undertook to cure him by an application. On the third day I was sent for again, and found him nearly in the same state as I left him. I divided the scalp, and found a fracture with depression. By means of the trephine and elevator, the depressed part was raised, and the dura mater being found in a very good state, and no apparent extravasation in the case, nothing more was done at that time. Proper medicines were ordered to procure stools. The next day his symptoms were the same, except that his pulse was less labouring, and he had not the apoplectic stertor, which he had till then. I examined the bone, which lay perfectly smooth, nor was the dura mater at all elevated into the perforation. Blood was freely drawn from the temporal arteries, and a stimulating clyster administered. On the fifth day no alteration. I applied a trephine in the middle of that part of the bone which had been depressed and elevated.[c] The dura mater was thinly covered with grumous blood, which being gently wiped away, more of the same appeared; for two or three days this discharge continued in small quantity; the boy gradually recovered his senses, and in due time got well.

[c] As this portion of bone must have been moveable, or unfirm, the operation must have been difficult. Without doubt, so experienced an operator as Mr. Pott took care to have the portion of bone properly supported by an assistant, with an elevator. E.

CASE XLII.

A young woman was thrown out from a country waggon, upon a broad flat pavement, and was said to have pitched upon her head. She was instantly deprived of sense, and brought to the hospital in that state. Her head was immediately shaved and examined, but found to be so absolutely free from all mark of violence, that I was in doubt of the truth of the account given of her. She was freely let blood, and some medicines directed to be got down, in order to empty her. The next day she was in the same state. More blood was drawn off, and her cathartic repeated. The third day, she being exactly the same, both the temporal arteries were opened. On the fourth, there being no alteration, I determined to apply a trephine on that part of her head, on which she was said to have fallen, and which when pressed hard seemed to produce such motion in her as if it gave some pain. In a case of less necessity this would hardly have been sufficient reason: but here something was to be attempted. I removed a large piece of scalp, and found the pericranium, though not detached absolutely, yet not naturally or firmly adherent. I applied the trephine, and when I had worked a few seconds, I took out the instrument to clean it, but was much surprised to find in it a piece of the upper table of the scull. I put in my finger to feel what was underneath, and found that it touched the remaining table, which receded from the finger, and returned again upon removing it; and when I pressed the said loose piece hard, the girl's whole frame was spasmodically agitated. What was to be done? It appeared to me, that if all her symptoms were not caused by the pressure of the loose piece, yet they were certainly aggravated by it, that it must therefore be taken away at all events, and that it was much too large to be extracted at the present opening: beside which, as it ran upward toward the sinus, I should not have chosen to run the risk of an hæmorrhage from thence while the sinus was covered with bone. I perforated all round the present opening with a small trephine, in such manner, that each perforation so bordered on the other as that the whole should make one opening.

For near one half the circle the outer table only came away in the instrument, leaving the inner loose and covered with blood, but in all the lower part the trephine went through both tables, and left the dura mater covered with grumous blood also. When the circle was finished, the loose portion was easily taken away; its upper part made a part of the sagittal suture, but no blood followed its separation. The dura mater under the whole was thinly covered with grumous blood. Next day she retained her urine, and opened her eyes. In two more she recovered her speech, and became as rational as I suppose she ever had been; and would in all probability have done well, as far as regarded the evils produced by mere pressure; but after some days matter formed between the detached dura mater and the scull, and the symptomatic fever usually accompanying such mischief came on with such rapidity, that all the efforts of art were vain.

CASE XLIII.

A PORTER, at work at the water side, was knocked down by a blow from an iron hook, at the end of the tackle belonging to a crane. He was senseless for near half an hour, but after that was so well as to walk home. The next morning he lost his sight, and by the evening his speech and faculty of walking. In this state he was brought to the hospital. He was largely let blood, and thoroughly emptied; and I intended, if these evacuations did not materially serve him, to have examined the state of that part of the bone whereon the blow was received; but that night he died.

Upon examining his head, a piece of the inner table of the right os parietale, of about an inch and half in length, and not quite so broad, was found detached from the outer table, having a quantity of blood both between them and on the surface of the dura mater.

These are the only instances which I have met with of fracture of the internal table alone; though I make no doubt, that some of those who have been said and thought to have been destroyed by concussion, have sunk under this kind of mischief.

OBSERVATIONS

ON

THAT DISORDER OF THE CORNER OF THE EYE,

COMMONLY CALLED

FISTULA LACHRYMALIS.

PREFACE.

By frequently conversing with some of that part of the profession who come to *London* to attend the hospitals, and to improve themselves in the art of surgery, it has appeared to me that the FISTULA LACHRYMALIS, though a very common disease, is one with which many of them are very little acquainted, either with regard to its cause, seat, or method of cure. Some are totally ignorant of every thing relating to it: others, who have an imperfect idea of its nature and seat, are yet much at a loss how to vary the method of treating it, according to its different states and circumstances; upon which distinction the probability of a cure does often in great measure depend; for if those means which are only proper in one state of the disease be used in another, the patient will be fatigued to no purpose; and the surgeon, by being frequently disappointed, will be inclined to think those cases incurable, which have only failed through his own mismanagement.

There is hardly any chirurgical disorder which requires a more close regard to all its appearances and variations than this does; and whoever expects to conduct it successfully, must attend to it constantly. This is, perhaps, the great reason why it is so little understood; the object is too minute, and the process often too long, to engage the attention; besides which, it hardly comes under the name of an operation, the great and almost only object

which they who come hither from the distant countries have in view: the operative part of surgery is what they have seen the least of, and therefore they are the more desirous of becoming acquainted with it: this desire is a very laudable one, and ought certainly to be encouraged, but still the operative part of surgery is far from being the whole of it; and I cannot help thinking, that by attending a little more to what is called common or practical surgery, our art might still be considerably improved, practitioners rendered more expert, and mankind much benefited.

The merely curing diseases is not all: that was done (sooner or later) while surgery and anatomy were in their most imperfect state, and while every branch of medicine laboured under many inconveniences which are now happily removed; but the different methods in which chirurgical disorders are treated, or their cures attempted, will make so considerable a difference in the confinement and sufferings of the patient, as to be very well worth attending to.

It may possibly be thought foreign to my present purpose, but I cannot omit this opportunity of adding a few words on a subject which appears to me highly deserving of some notice, as its influence may be very extensive and very prejudicial; it is the false idea which the by-standers at an operation generally have of chirurgic *dexterity;* to which word they annex no other idea than that of quickness. This has produced a most absurd custom of measuring the motion of a surgeon's hand, as jockeys do that of the feet of a horse, viz. by a stop-watch; a practice which, though it may perhaps have been encouraged by operators themselves, must have been productive of most mischievous consequences. *Tute et celeriter* are both very proper characteristics of a good chirurgic operation; but *tute* stands, as it should do, in the first place; as the patient who suffers the smallest injury from the hurry of his operator, has no recompense from the reputation which the latter ob-

tains from the by-standers. In most of the capital operations, unforeseen circumstances will sometimes occur, and must be attended to; and he who, without giving unnecessary pain from delay, finishes what he has to do in the most perfect manner, and the most likely to conduce to his patient's safety, is the best operator.

I have endeavoured to make the following tract as plain and as intelligible as I can; and, if it should appear prolix to those who are already acquainted with the subject, I must beg leave to observe, that it was not written for their information; but if any of those who were unacquainted with it before, should from hence gain any useful knowledge, my end will be answered, and I shall be much gratified.

OF THE

FISTULA LACHRYMALIS.

SECTION I.

The ancient writers were in general so little acquainted with the anatomical structure of the parts concerned in this disease, that both its cause and seat have been very erroneously represented by most of them; other disorders, very different both from this and from each other, have been confounded under the same general appellation; and the means made use of toward obtaining a cure, being adapted to such misconceptions, were rough, painful, and most commonly ineffectual.

The fluid which perpetually moistens the eye, was supposed to be secreted by that small eminence in the inner angle, now called the caruncule, and to flow from thence upward through the puncta lachrymalia.[a] The caruncule was by many thought to be the seat of the disease in question, which was said to be produced, either

[a] Fallopius, who has very accurately described the puncta lachrymalia, sacculus, and duct, as well as the disease, has yet fallen into this common error. "Ad occulos ipsos ex faucibus egrediens venio, in quibus primum pætermisere "anatomici duo foramina parva in angulo interna posita, quarum, unum est in "palpebra superiori, alterum in inferiori, in viventibus adhuc hominibus, si "quis inspicere voluerit apparentia, quæ foramina habent meatus qui sub "caruncula encanthidos vel epicanthidos dicta uniuntur in quendam com-"munem sinum in narium cavitatem desinentem per canalem proprium in "osse squamoso, quod internum angulum occupat insculptum.

"Per hos meatus major lachrymarum pars ut ego in fletibus mulierum "observavi, ad occulos emanat."

Fallopius.

by a defluxion from the brain[b] on this part, or by an abscess formed within the body of it; or, by a lodgement of the tears, become acrid and corrosive in consequence of such stagnation;[c] while others looked upon it as a kind of encysted tumor. The swelling in the inner corner of the eye, the frequently-attendant ophthalmy, the involuntary flux of serum down the cheek, the excoriation of the eye-lid, and the discoloured discharge upon pressure, strengthened their opinions, and confirmed their prejudices.

They who supposed it to be caused originally by a defluxion of the inflammatory kind, tending to produce an abscess, had recourse at first to those general methods and means which were thought most likely to prevent such consequence: these not answering, they proceeded to open the supposed abscess, and to endeavour the digestion of it: on the other hand, they who supposed it to be an encysted tumor attempted the eradication of it

"Non enim os solummodo cariosum, verum etiam glandula ita erosa erat, "ut quotiescunque puer ploraret, lachrymæ per ipsam fistulam copiosè ex-"tillarent."

HILDANUS.

[b] "Fistula lachrymalis sit ex humorum decursu, qui currunt ad lachrymalis "angulum juxta nasum, nec propter eorum multitudinem, et grossitatem "possunt exire, &c. hi autem morantes ibi diutius corrumpuntur, et locum "ulcerant."

LANFRANC.

"Ægylops est tumor abscessorius inter majorem angulum, et nares pro-"venens."

PAULUS.

[c] "At the great corner of the eye there is a glandule made for receiving "and containing the moisture which serves for lubricating the eye; this "glandule sometimes, by a sanguine or pituitous defluxion falling violently "from the brain, swells and impostumates, and ulcerates," &c.

AMB. PAREY.

"Hæc caruncula ab acrium humorum affluxu turget, nonnunquam intu-"mescit, et abscedit ulceraturque, ulcere non raro in fistulam abeunte, adeo "ut subjectum os corrumpatur."

MUNNICKS.

"Per pusillum utriusque palpebræ foramen lachrymalæ naturaliter ef-"fluunt."

FAB. AB. AQUAPENDENTE.

"Lachrymæ veniunt per lachrymalia a foramine quodam parvo, et quasi "insensibili in fine pilorum."

GUIDO.

either by knife, caustic, or cautery; and all of them taking it for granted, when the discharge was apparently purulent, or much discoloured, that the bone was rotten, advise the use of escharotic applications, or the hot iron, to destroy the callosity, and to dry and exfoliate the caries; and these methods failing, as in the nature of things they very frequently must, they pronounced the disease to be incurable.

A more minute and careful examination into the anatomy of the parts has given us a more true idea of the disorder, and furnished us with a more rational, as well as a more successful, method of treating it. We now know that the caruncule is not the organ which secretes the tears, but that this office is performed by a gland, situated near the outer corner of the eye; that the lachrymal fluid is in its nature perfectly innoxious; that an obstruction in the nasal duct is most frequently the primary and original cause of the complaint; and that its seat is in the sacculus lachrymalis.

Upon these principles the modern practitioners have, with great industry and ingenuity, endeavoured to find out some means whereby this obstruction may be removed, and the parts restored to their natural and healthy state, without such pain, destruction, and deformity, as the ancient methods occasioned; or, these failing, to establish a new artificial passage, which may in some measure supply the place of the natural one.

All these means have the merit of being founded on the natural structure of the parts concerned. When the more easy and mild ones succeed, the patient gains a considerable advantage; and when they do not, little time is lost, nor is any more efficacious method rendered thereby less practicable: in this, as in every other part of surgery, the more simple means ought to be first tried; pain should be avoided as much as possible, except when absolutely necessary, and then it must be submitted to.

SECT. II.

That the motions of the eye-lids may be performed with the utmost ease, that the tunica cornea may be kept constantly clean, bright, and fit for the transmission of the rays of light, and that dust, and other hurtful particles, may be immediately washed away, the surface of the eye is continually moistened by a fine limpid fluid.

This fluid is derived principally from a large gland, situated under the upper edge of the orbit near the outer corner of the eye, which gland is of the conglomerate kind, and lies in a small depression of the os frontis; its excretory ducts, or those by which it discharges the secreted fluid, piercing the tunica conjunctiva, just above the cartilaginous borders of the upper eye-lids.

While the caruncule was thought to be the secretory organ of the tears, this gland bore the title of glandula innominata; but now that its use and office are known, it is called glandula lachrymalis.

By irritation from any sharp or poignant particles, a large quantity of this fluid is immediately secreted, and by the motion of the eye-lids is as immediately derived over the surface of the eye, by which means such particles are washed and wiped off. Sometimes also the passions of the mind produce an immediate increase of this lymph, which is then strictly and properly called tears; a constant secretion of too large a quantity causes a disease, called epiphora; and a deficiency of it makes the motions of the lid difficult and painful.

Although the fluid secreted by the lachrymal gland is considerable in quantity, yet when it is not suddenly produced by irritation from without, or passion within, it is so constantly and gradually carried off, as to create neither trouble, uneasiness, nor blemish.

The edge, or border of each eye-lid, is formed by a thin cartilage, the figure and consistence of which keep the lids properly expanded; these cartilages are covered by a fine membrane, and are called cilia; their internal edges do, upon every motion,

sweep over every point of the surface of the cornea; this motion, though almost imperceptible unless attended to, is very frequently performed; and as the secretion of the fluid is also constant, the eye is by this means kept always moist, clean, and bright.

At the extremity of each of these cartilaginous borders of the eye-lids, on the side next the nose, is the small papilla, or eminence; and in the middle of each of these is a small hole, or perforation, which being made in the cartilage is not liable to collapse while the parts are in a sound state, but remains always open: they are called the puncta lachrymalia, and their office is to receive the lachrymal fluid, as it runs off the corner along the edges of the eye-lids, thereby preventing it from trickling down the cheek; and that there may be no impediment to the constant execution of this office, during the time of sleep, as well as that of being awake, the internal edges of the cilia do not come into immediate contact with each other in that point where these orifices are.

From each of these puncta lachrymalia proceeds a small membranous tube, which tubes soon enter into, or form a pouch or bag, situated near the inner angle of the eye, just below the union of the two lids, under the musculous orbicularis palpebrarum; the bag is called the sacculus lachrymalis, and its office is to receive all the lymph brought by the puncta and ducts: the upper part of this sacculus lies in an excavation, formed partly by the nasal process of the os maxillare superius, and partly by the os unguis; the lower part of it is confined in a long channel, and forms a tube, or duct, which descending obliquely backward communicates with the cavity of the nose, behind the os spongiosum superius, by an opening whose size is somewhat different in different subjects.

This passage is called the ductus ad nares or the ductus nasalis, and through it whatever is received by the sacculus from the puncta, does, in a healthy and sound state of these parts, pass into the nose.

The membrane which lines this sacculus and duct, is in its structure much like to the membrana pituitaria narium, from the surface of which a clear viscid mucus is secreted, and by which

the sacculus and passages are constantly moistened and kept pervious.

While the parts are in a healthy sound state, the fluid secreted by the lachrymal gland passes off through the puncta, sacsulus, and duct, into the nose, without any trouble; but when they are in a diseased state the case is otherwise. This membrane, like all other vascular parts, is liable to inflammation, by which means it often happens that it is so thickened as to obstruct the nasal duct, and thereby much impede, or totally hinder, the passage of any thing through it; in consequence of which obstruction the sacculus is filled by its natural mucus, and the derivation of the serum from the lachrymal gland through it being thus prevented, it runs off from the eyelids down the cheek: this obstruction continuing, and the mucus still lodging, the sacculus is dilated, and produces that tumor in the inner corner of the eye, and that discharge, upon pressure, which characterise the first state of the disease in question, and, in conjunction with several other attending symptoms, prove its seat to be in the lachrymal sac, and nasal duct.

SECT. III.

Although the seat of this disease is the same in almost every subject, yet its appearance is very different in different persons, and under different circumstances. These variations depend principally on

1. The degree of obstruction in the nasal duct.
2. The state of the cellular membrane covering the sac.
3. The state of the sacculus itself.
4. That of the bone underneath.
5. The general state and habit of the patient.[d]

[d] As the state and circumstances of this disease are really various, and differ very essentially from each other, the general custom of calling them all by the one name of fistula lachrymalis is absurd.

Sometimes a serous kind of defluxion, by which the lining of the sac and duct is so thickened as to obstruct, or prevent, the passage of the fluid through them into the nose, makes the whole complaint; and the cellular membrane on the outside not being diseased, there is no appearance of inflammation. In this case the duct is stopped, and the sacculus dilated, but without any alteration in the colour of the skin; a fulness appears in the corner of the eye next to the nose; and upon the application of a finger to this tumor, a clear viscid mucus is discharged through the puncta lachrymalia: the patient feels no pain, nor finds any inconvenience, except what is produced by the discharge of this mucus, and by the trickling of the lymph down the cheek.

In some cases the mucus is not perfectly and always clear, but it is sometimes cloudy, and looks as if it had a mixture of milk or cream in it: at first waking, some of it is generally found in the corner of the eye; and the eye-lashes, being smeared over with it during sleep, most commonly adhere together in the morning.

This is the most simple state of the disease, what the French have called the hernia, or hydrops sacculi lachrymalis: it is frequently met with in children who have been rickety, or are subject to glandular obstructions; and in this state it sometimes remains for some years, subject to little alterations, as the health or habit shall happen to vary, the sacculus being sometimes more, sometimes less full, and troublesome; the mucus which is pressed out is sometimes more, sometimes less cloudy, and now and then it is attended with a slight ophthalmy, or an inflammation of the eye-lids, but which by common care is easily removed.

When the sacculus is not much dilated, the discharge small, and produced only by pressure, the chief inconveniences are the weeping eye, and the gumming together of the lids, after sleeping: but these, by being attended to, may be kept from being very troublesome; and if the disease makes no farther progress, may be so regulated as to render any more painful process totally unnecessary.

When the dilatation is considerable, the swelling is more visible, and the quantity of mucus is larger: it is also in this state more frequently mixt and cloudy, and more troublesome, from the more frequent necessity of emptying the bag. But if the patient be

adult, it may, even in this more dilated state of it, be kept from being very inconvenient.

If an inflammation comes on, the tumor is thereby considerably increased, the discharge is larger, as well during sleep as upon pressure; the skin covering it loses its natural whiteness and softness, becomes hard, and acquires an inflamed redness; and with the mucus a mixture of something, which in colour resembles matter, is discharged, especially if the pressure be made with any force, or continued for any time: this circumstance, added to the painful sensation, and inflamed appearance of the parts, has been productive of a supposition, that in this there is either an ulcer or an abscess within the sacculus or duct.

As this is an opinion which, though it may possibly sometimes have some foundation in truth, yet it is in general entertained much too hastily, and is also the principal source whence most of the mistakes concerning this disease have sprung, I would beg leave to be indulged a few words on this subject.

It has already been observed, that from the surface of the membrane which lines these parts a thin mucus is secreted, by which its surface is smeared over, in the same manner as is that of all the membrane which covers or lines the fauces, larynx, and internal parts of the nose, the antra of the jaws, and the sinuses of the sphenoid and ethmoid bones, &c. While the lachrymal sac is free from disease, and the ductus ad nares open, this mucus is nearly limpid in colour, small in quantity, and passes insensibly into the nose with the fluid from the lachrymal gland; but when, by the obstruction of the nasal duct, that passage is denied, it necessarily lodges in the sacculus; by distending and irritating its containing bag it is increased in quantity, altered in colour, and discharged at the puncta lachrymalia, as it either becomes too much for the sac to contain, or as it is forced out by pressure. This is a short and succinct account of the true nature of the disease, and such as will fairly and truly account for all its symptoms and appearances, without any recourse to either abscess or ulcer, circumstances which very seldom, if ever, attend it.

That which is mixed with the clearer part of the mucus, and which from its pale yellow hue is taken for matter, is not matter, but mucus, which in this part, as well as several others in the

body, does, either by being confined beyond the necessary time, or by inflammation, or irritation of the gland or membrane which secretes or contains it, or even from general affection of the habit, put on a yellow purulent colour, where there is neither abscess nor ulcer in the part whence it comes.

So many instances of this are producible as to put the matter beyond all doubt; the urethra, vagina, and all the sinuses of the head which communicate with the nose, furnish us with them daily; the linings of all these are constantly imbued with a mucus naturally clear, and no more in quantity than is necessary to keep the membranes moist; but either inflammation or irritation does immediately so add to its quantity, and so alter its colour, that in the two former the same mistake has often been made as in the subject in question; that is, the discharge has been thought to be purulent, and produced by ulceration of the parts.

These two fluids, pus and mucus, which have been so frequently confounded together, do really differ so widely from each other in their nature, constitution, sources, purposes, and effects, that to distinguish them properly, and to point out the true character of each, seems to be a matter of much importance: it would carry me too wide from my present purpose to attempt it in this place, and therefore I shall only just mention what may serve merely to illustrate that.

If I conceive rightly of this affair, mucus, considered in a general sense, is the effect of a natural secretion made by glands, membranes, or other bodies appointed for that purpose, and is so far from being originally the consequence of disease, that, in a due quantity, it is absolutely necessary for several very important purposes in the animal economy; which purposes, when this fluid is deficient, must be ill executed, and some kind of disease or defect follow: whoever will reflect upon the uses of it in the intestines, joints, sheaths, or capsulæ of the tendons, in the sinuses of the scull serving the purposes of speech, in the cavity of the nose, where the olfactory nerves do their duty, in the prostate gland, larynx, trachea, urethra, and vagina, will be easily convinced of the truth of this assertion, both with regard to its natural uses in a healthy state and proper quantity, and the share it frequently

has in the production of diseases, when it is either vitiated or redundant.

Pus, or matter, is certainly no natural secretion; suppuration, though it be an act of nature when some parts of the body have been forcibly divided from each other, is nevertheless to be regarded as the effect of violence and destruction, at least of division; for, without entering minutely into the origin or nature of it, I believe I may venture to affirm, that the dissolution of some of the solid particles of broken capillary vessels, and a mixture of some part of the juices which should circulate through them, make a necessary part of its production. However constant its appearance may be in the progress toward healing a wound or sore, yet it never is produced, even in the smallest quantity, without some degree of erosion, some breach in the natural structure of the parts; and when such breach is healed, the discharge necessarily ceases.

On the contrary, mucus may, by irritation, relaxation, or defluxion, on its secreting or containing parts or organs, be increased to a quantity far beyond what is necessary or useful, and produce thereby a disease in parts where there is not the least degree of solution of continuity, as in the cases of tenesmus, stone in the bladder, fluor albus, and simple gleets from the urethra; as also in that kind of defluxion on the nose and fauces, producing a catarrh, and in the immediate effect of all sternutatories.

Other differences between the nature and properties of the two fluids might be mentioned; but if these already cited are just, they will be sufficient to evince the impropriety of confounding them together, either with regard to theory or practice.

Nor is this mistake of discoloured mucus for matter confined to the lachrymal sac only; the two circumstances of pain, and yellow colour, having in almost all times produced the same misconception in the virulent gonorrhœa of both sexes: this has been called pus, and being said to proceed from ulcerations in the urethra and vagina, though the repeated testimony of those who have, immediately after death, examined the parts of persons so diseased, has often been produced to the contrary, and though the discharge itself when properly examined will always prove the contrary, inflammation and irritation of the membranous linings of the urethra

and vagina will fully account for all the appearances in this disease, in which there is neither matter, nor ulcer, nor abscess: whoever will attend to the discharge made from a purulent ulcer, will find it widely different from that which issues from either of the above parts in the gonorrhœa.

Again, in case of strictures in the male urethra, the discharge occasioned by a bougie, properly and judiciously used, is a discoloured mucus, and not matter, though it is generally so called: it is from the discharge of this mucus, and the dilatation of the passage, that the relief is obtained, not from any destruction or division of parts: the bougie which produces true matter does much more harm than good, and makes a sore where there was none, and where there ought to be none. How often do catarrhous defluxions on the trachea and larynx wear toward the close a deep purulent colour, so as to deceive the unknowing into an opinion, that it is matter upon the lungs? But no judge of these things ever had recourse to abscesses or ulcers for a solution of such appearance. The argument drawn from the quantity of these discharges is as erroneous as those taken from its colour; as an inflammatory defluxion on the part does generally occasion the latter, so mere irritation will produce the former, which does also generally cease when the irritating cause is removed or appeased. How immediately is a most troublesome tenesmus cured by a clyster of starch and opium? What large fœtid discharges are made from behind the prepuce of many persons, not only free from all venereal taint, but without any ulceration of the parts, by a kind of exsudation? To what length of time will they not continue, if neglected, and how immediately do they cease by the use of a spirituous or vitriolic wash? How often is the fluor albus, even in some of its worst circumstances, moderated, not to say cured, merely by washing away the acrid mucus, which, lodging in the rugæ of the vagina, continually irritated the parts to a fresh discharge, and perpetuated the disease? What quantity of slime is there in the urine of those who have a stone in the bladder? And how totally does it cease, upon that stone being discharged, or taken away? Whereas neither cleansing of parts, nor removal of irritating bodies, does, or ever can procure, an immediate cessation of a discharge of true matter, which being occasioned by a solution of con-

tinuity, an erosion or division of the parts whence it proceeds must decrease gradually, and at last can only cease by such part becoming whole again.

In short, the two fluids are so absolutely different and distinct, that the blending them together in our ideas of disease, proceeding from, or producing either of them, cannot be too industriously avoided. It is a subject on which a great deal more might be said, as it would comprehend, or have relation to many disorders which perhaps are not sufficiently understood, or attended to; but being beside my present purpose, I shall say no more about it, only desire that I may not be misunderstood as if I meant to assert, that there never is abscess or ulcer in the lachrymal sac and duct: No, I only mean to signify, that it is my opinion, that the yellow or purulent colour of the discharge, which is generally received as a proof of such, is no proof at all; that this colour may be, and most frequently is, dependent on other causes; that though by the suppuration of the cellular membrane covering the sac, the upper part of it sometimes becomes sloughy, and bursts; yet the lower part of it, and the nasal duct, are often at the same time perfectly sound; and that there never is abscess or ulcer within, while the skin is entire, and preserves its natural hue and softness, let the colour of the discharge be ever so yellow; circumstances of no small consequence in the treatment of this disease.

The inflammation of the cellular membrane covering the sac, is a circumstance which makes a considerable difference, both in the appearance of the disease, and in its requisite treatment: in some cases it is confined merely to the surface of the tumor in the corner of the eye; in others, it spreads still farther, affecting the eye-lids, cheek, and side of the nose.

When the parts are in this state, the mucus within the bag has generally the appearance of being matter, that is, it wears a deep yellow colour, and is of a more thin consistence. If the puncta lachrymalia are naturally large and open, and the inflammation confined to the surface of the sac, its contents will pass off pretty freely, and the skin will remain entire: this is what the ancients called the simple, or imperfect, or anchylops.

But when the skin covering the lachrymal bag has been for some time inflamed, or subject to frequently returning inflamma-

tions, it most commonly happens, that the puncta lachrymalia are affected by it, and the fluid, not having an opportunity of passing off through them, distends the inflamed skin, so that at last it becomes sloughy, and bursts externally. This is that state of the disease which is called perfect Aigylops, or Ægylops; the discharge which used to be made through the puncta lachrymalia, while the skin was entire, is now made through the new opening, and, by excoriating the eye-lids and cheek, increases the inflammation, and gives the disease a much more disagreeable appearance. In some the matter bursts through a small hole, and, after it has discharged itself, the tumor subsides, the neighbouring parts become cool, and, though the skin covering the surface of the sacculus is sloughy and foul, yet there is no reason to believe that the sac itself is much diseased below; in others the breach is large, the skin remains hard and inflamed, and, from the appearance of the sore, there is reason to suppose the whole inside of the bag to be in a diseased state; and, in some cases, which have been much neglected or irritated by ill treatment, the cavity of the sacculus seems to be filled with a loose ill-natured fungus, which gleets largely, and produces inflammation and excoriation of all the parts about.

There is also another circumstance which sometimes is found to attend this disorder, viz. a carious state of the bones. This was by our forefathers supposed to be a frequent one, and was the principal reason for their so free use of caustic, cautery, and scalpra, in the treatment of it; but, since the disease has been more minutely examined into, this circumstance has been found to be a very rare one. When the fistula lachrymalis is a symptom of the lues venerea, as it sometimes is, the bones are indeed often carious; but then, the fistula is not the original complaint, but produced secondarily, and is a consequence of the diseased state of the os ethmoides, and ossa spongiosa, of the nose, and is not curable by any local means or applications, but depends entirely on the cure of the disease of which it is a symptom.

I have also seen an abscess after the small-pox, which, by falling on the lachrymal bag, has made it all slough away, and leave the bones bare; which circumstance I have also seen attend the free use of strong escharotics applied to destroy what is called the cyst;

but, without the accession of some other disorder producing it, or the most absurd method of treating the complaint, I believe that a caries of the bones will very seldom be met with. Indeed the combination of other diseases, either of the general habit, or affecting the same, or the neighbouring parts, does often make a very material difference, both in the appearance of the disorder, in the prognostic, and in the proper method of treating it, which, therefore, should always be inquired into: for instance, the patient is sometimes subject to an habitual ophthalmy, or lippitudo, which will add to the deformity, and give a good deal of additional trouble during the cure; an ozæna, or some other disease of the membrane, and cells of the ethmoid bone, or a polypose excrescence within the nose, are now and then combined with it: the habit is sometimes, as I have before observed, infected with the lues venerea, of which this disease may be a symptom; strumous glandular obstructions are its too frequent companions; and, what is worst of all, it is sometimes cancerous.

SECT. I.

From what has been said, I think it will appear that this disease, in its primary and most simple state, consists in a detention or lodgement of mucus in the sacculus lachrymalis, in consequence of an obstruction of the natural passage from that bag into the nose; that by means of this lodgement the sacculus is distended, irritated, and sometimes inflamed; that the fluid which passes from the lachrymal gland over the eye to the puncta lachrymalia, being prevented by the fulness of the sac from getting into it, runs down the cheek; and therefore that the characteristic marks of the disorder, when recent, are a small tumor in the corner of the eye, an involuntary flux of serum down that side of the face, and a discharge of mucus through the puncta lachrymalia upon pressure.

This lodgement, being originally produced by the stoppage of

the natural duct, it follows, that the first curative intention is, the removal of that obstruction; which is sometimes practicable, but more often not; the degree of obstruction, its date, the state of the adjacent parts, and some other circumstances, rendering it more or less so in different subjects.

That the inexperienced practitioner may be guarded against giving a hasty prognostic, or making attempts, which, however fatiguing to the patient, must in the end prove fruitless; and that he may be enabled to understand the disease more perfectly, I shall take the liberty to divide it into four general heads, or states, under which all its lesser distinctions may be comprehended.

The first consists in a simple dilatation of the sacculus, and obstruction of the nasal duct, discharging upon pressure a mucus either quite clear or a little cloudy; the skin covering the bag being entire and perfectly free from inflammation.

In the second, the tumor is somewhat larger; the skin which covers it is in an inflamed state, but entire; and the discharge made through the puncta lachrymalia is of a pale yellow, or purulent colour.

In the third, the skin covering the sacculus is become sloughy and burst, by which means the swelling is in some measure lessened; but the mucus, which, while the skin was entire, used to be pressed out through the puncta lachrymalia, now discharges itself through the new aperture; the ductus ad nares, both in this and the preceding state, is not otherwise diseased, than by the thickening of its lining.

In the fourth, the passage from the sacculus lachrymalis in the nose is totally obliterated, the inside of the former being either ulcerated, or filled up with a fungus, and attended sometimes with a caries of the bone underneath.

These will, I think, comprehend every state and circumstance of the disease, and, if attended to, will in general point out the proper method of treating it.

The ancients, who supposed this disorder in its first state to be an inflammatory defluxion from the brain on the caruncle tending to suppurate, directed their first attention to prevent such consequence; for which purpose they employed phlebotomy, cathartics,

issues, setons, collyria, and refrigerant applications of all sorts;[e] and these not succeeding, they had recourse to such as they thought would hasten the suppuration of the supposed abscess.[f]

[e] The old writers have many forms of collyria, epithems, &c. which they used upon this occasion, but issues and setons they lay great stress on, which practice may immediately satisfy us what was their opinion of the nature of the disease.

"Omnium vero præstantissimum est setaceum, materiam enim ad oculos "fluentem potenter ad se trahit et evacuat, caput ab omnibus excremen- "titiis humoribus expurgat, et egregie coroborat; quid plura, tanti est "momenti ut inveteratam fistulam lachrymalem sine hoc præsidio vix curari "posse."

Mr. Serjeant Wiseman most certainly did not understand this disease; and mistook it either for a tumor of the encysted kind, or for an inflammatory defluxion, and treated it as such: his words are—

"Ægylops is a tumor of the inner canthus of the eye, either scrophulous, "ætheromatous, or of the nature of a meliceris, or sometimes with inflamma- "tion: the causes of Ægylops are the same that produce the like tumor in "other places, but sometimes it is made by fluxion, and appeareth first as a "phlegmon: if it be struma or ætheroma, it is made by congestion."

"The indications of cure are taken from the Ægylops, whether it be in its "beginning with inflammation, or by congestion, passing its matter forth "under the cilium into the eye, in which case it is fistulated. Anchylops "has also its peculiar way of treating, as other tumors of the glands."

Without any design to criticise on the strange unintelligibility of the Serjeant's language, I believe I may venture to say, that no man who is not previously acquainted with the nature of the disease, will learn from hence that its seat is in the lachrymal sac, and that an obstruction in the nasal duct is the first cause of it.

To come still nearer, or even into our own time, Dr. Daniel Turner compiled a treatise of surgery, which was universally dispersed and read all over the kingdom, and was at that time generally looked upon as a true representation of the London practice: the Doctor says, "Anchylops or Ægylops are "diseases of the internal canthus of the eye, in which the lachrymal gland is "concerned, and from whence the fistula of the same part is denominated: "the prognostic may be gathered from the method of cure, in which uni- "versals premised, such as bleedings, purgings, &c. you may attempt to "dissolve the humour by some gentle anodyne, or discutient cataplasm; but if "it inflame and suppurate, you must hasten maturation, as well as the dis- "charge, by reason of the part it lies upon; but when, notwithstanding all "your endeavours to incarn and agglutinate, the matter continues to dis- "charge itself, not only by the outward orifice, but also under the cilium "into the eye, you must try some more powerful desiccative."

I believe no one will venture to say, that the nature and seat of the disease are more or better explained by what the Doctor has said, than by the

By the improper use of medicines of the latter kind, it frequently happened that the skin became inflamed and bruised; the discharge which necessarily followed this accident, together with the heated appearance of the parts about, confirmed their opinion of a collection of matter within; and according to such supposition, they attempted to obtain a cure by dilating the orifice, and endeavouring to make an incarnation from the bottom of the hollow: not being acquainted with the situation or use of the nasal duct, they took no care to free it from the obstruction under which it laboured, but dressing the sore like a common imposthumation, permitted it either to be filled up with a loose fungus, or to contract itself to a narrow fistulous orifice, which daily discharging a discoloured kind of fluid, and not healing by such means as they made use of, they concluded the bone underneath was carious, and made way down to it, either by removing the parts with a cutting instrument, or by destroying them with caustic and cautery, intending to procure an exfoliation, and thereby a firmer basis to heal on.[g]

But since the use of the ductus nasalis has been known, since it has been discovered that an obstruction in this is the primary and principal cause of the disorder, and that what passed for the cavity of an abscess is really the sacculus lachrymalis, both the intention of cure and the means have been considerably altered.

Serjeant; and I think it is perfectly clear that neither of them had any true idea of it at all: they both mistook the caruncle for the lachrymal gland, and the disease for an encysted, or a scrophulous tumor, which ought to be brought to suppuration; the lachrymal sac, the ductus ad nares, their use, and the disorder of them creating the complaint in question, they were totally unacquainted with.

[g] Humulo summum ejus foraminis excipiendum, et totum id cavum sicut in fistulis dixi, usque ad os excidendum.

CELSUS.

Corpus id quod inter angulum usque ad abscessum est excoluimus, et carnes e profundo educimus; quod si igitur per summa ruptus fuerit abscessus, totum id quod eminet usque ad os excidendum.

PAULUS.

Si vero per hæc medicamenta non curetur, aut recediraret postea, signum est quod os est corruptum de subtus, quare tunc oportet locum detegi et os, corruptum removeri.

LANFRANC.

In the first and most simple state of the disease, viz. that of mere obstruction without inflammation, much pains have been taken to restore the parts to their natural state and use, without making any wound or division at all; the introduction of a probe, the injection of a fluid, and a constant compression made on the outside of the sacculus in the corner of the eye, are the principal means by which this has been attempted.

Some few years ago M. Anel made a probe of so small a size as to be pable of passing from the eye-lid into the nose, being introduced at one of the puncta lachrymalia, and passing through the sacculus and duct; with which probe he proposed to break through any small obstruction which might be found in its passage.

He also invented a syringe whose pipe is small enough to enter one of the puncta, and by that means to furnish an opportunity of injecting a liquor into the sacculus and duct; and with these two instruments he pretended to be able to cure the disease whenever it consisted in obstruction merely, and the discharge was not much discoloured. The first of these, viz. the passage of a small probe through the puncta, has a plausible appearance, but will, upon trial, be found very unequal to the task assigned: the very small size of it, its necessary flexibility, and the very little resistance it is capable of making, are manifest deficiencies in the instrument; the quick sensation in the lining of the sac and duct, and its diseased state, are great objections on the side of the parts, supposing that it was capable of answering any valuable end, which it most certainly is not.

That the passing a fine probe from one of the puncta lachrymalia into the nose is very practicable, I know from experience; but I also know from the same experience, that the pain it gives, and the inflammation it often excites, are much greater than any benefit which does or can arise from it.

It is said that the principal use of this probe is to clear the little ducts leading from the puncta into the sacculus, and the obstruction of those ducts is often mentioned as a part of this disease; by which one would be led to suppose that it was a circumstance which frequently occurred, whereas it is seldom or never met with, and when it does happen, can never produce the

disease in question, the principle characteristic of which is, a discharge into the inner corner of the eye upon pressure made in the angle: this discharge is made from the sacculus, through the puncta, and proves that the latter are open. The passing a probe therefore through these seems to be perfectly unnecessary, since a stoppage of them would never give rise to that disease, which consists in an obstruction to the passage of any thing from the sac into the nose, and not from the eye into the sac.

The syringe, if used judiciously while the disease is recent, the sac very little dilated, and the mucus perfectly clear, will sometimes be found serviceable: I have used it where, I think, it has been much so; I have by means of it injected a fluid through the sacculus into the nose, and in two or three instances have effected cures by it: but I have also often used it ineffectually; it gives no pain, and a few trials render the use of it very little troublesome.

Fabritius ab Aquapendente invented an instrument, which was so contrived, as by means of a screw to make a pressure externally on the lachrymal bag, from the use of which, he says, his patients received much benefit: this instrument has been considerably improved by late practitioners, and is still recommended as very useful.

All the good that can be obtained by compress and bandage, this screw is capable of procuring; but it is also subject to all the same inconveniencies, arising from the impossibility of determining exactly the due degree of pressure: for if it be so great as to bring the sides of the upper part of the sac into contact, all communication between it and the puncta will be thereby stopt: if it be but slight, the accumulation will not be prevented, nor does it in either case contribute to the removal of the obstruction in the nasal duct, the primary and original cause of the disease.

If the curative intention was to procure an union of the sides of the sacculus, as in the case of parts separated from each other by the formation of matter or sloughs, and the pressure could be made uniformly and constantly, possibly it might be so managed as to answer a valuable purpose: but as that is not the intention, the pressure, whether made by an instrument, or by a common roller and compress, contributes little or nothing toward a cure,

nor did I ever see one effected by it, although I have several times tried both.

That some slight obstructions of the nasal duct have gone off while the compression has been used, I do not deny; but am in great doubt concerning the share which it had in removing them, having seen more than one instance of a cure being obtained by the use of a proper regimen and medicines, in slight and recent cases, where nothing is used externally but a vitriolic collyrium; and having been always disappointed in my attempts at mere bandage of any kind.

Besides these means of attempting a cure without incision, the gentlemen of the French Academy have favoured us with some others, such as the introduction of a probe into the lower part of the nasal duct within the nose, the injection of a fluid by the same orifice, the passing a seton from the punctum lachrymale superius through the sacculus and duct, and out at the nostril, there to remain till the cure is completed; and for those purposes they have invented and given figures of a number of probes, syringes, and many other instruments, which, they say, have been very successfully used: far be it from me to say that they have not, or to prevent any body from trying those, or any other means by which mankind may be cured of diseases with the least possible fatigue and pain; but from the experiments which I have made of most of these processes, I must beg leave to suspend my assent to their general utility, or even to their frequent practicability.

Repeated trials upon dead subjects will undoubtedly enable a man to pass the probe, or perhaps now and then the seton, but he will also find it often absolutely impracticable; and in the few instances in which he may chance to succeed as to this attempt, what will in general be the consequence? not what the writers on these subjects have taught him to believe, a cure, but a sense of pain and degree of inflammation, which the patient, before such attempts were made, was free from—an exasperation of the disease, and a loss of much time, as I have more than once experienced. To which consideration may be added, that infants and young children are very often afflicted with this disorder, and that such processes as these are absolutely impracticable upon them.

I should be very sorry to be misunderstood in what I now say,

to have it suspected, that I mean to derogate from the character of those gentlemen who have been the inventors of these operations, or that I speak slightingly of them, either because they are not my own, or because I have not been able to succeed in the use of them: it would give me great concern if I thought it would be believed that I acted upon so mean, so narrow a principle; no man is or would be more pleased with any real improvement in our art than myself; but having taken all the pains in my power to apply the discoveries of which I am now speaking to practice, (the only test of good surgery,) and having found them most frequently impracticable, always ineffectual, I think myself obliged to say so.

Anel's syringe I have used successfully, and think it may now and then be very well worth trying, in recent cases more especially, as it may always be used without giving any pain or running the risk of raising an inflammation; but I must also beg leave to observe, that if the bag is not much dilated, the mucus clear, the skin and cellular membrane uninflamed, and the parts about soft and easy, if the patient will take care not to suffer too great an accumulation, will, by the frequent use of a vitriolic collyrium, keep the eye-lids clean and cool, and carefully avoid such things as irritate the membrana narium, or occasion a sudden flux of lymph from the lachrymal gland, the disease may for many years, nay often for life, be kept from being very troublesome or inconvenient, without any surgery at all.

SECT. V.

When the disease is got beyond the simple state just described, that is, when the parts round about are much, or constantly inflamed, or the skin covering the tumor is burst, there is something more to be done if a cure be intended.

In this state an opening in the upper part of the sacculus lachrymalis becomes in general absolutely necessary; and as a wound made by a knife leaves a much less disagreeable scar, than that which necessarily follows the bursting of the skin, one being a

mere simple division, the other a loss of substance, it will always be found best to anticipate the accident of bursting, by making the opening as soon as the integuments are in such a state as to threaten it.[f]

For the making this incision authors have been very particular in their direction with regard to its place, manner, and form: they have ordered it to be semilunar, having its concave part toward the eye, and that the point of union of the lids should be exactly opposite to the centre of the incision. This lunated figure was calculated to correspond with the course of the fibres of the orbicular muscle, upon a supposition that a transverse section of them would produce an inversion of the lower lid, an effect which never follows. All that the surgeon need observe is, to take care to keep the knife at a proper distance from the juncture of the palpebræ, to begin the incision a very little above a line drawn from that juncture toward the nose, and to continue it downward: its form may full as well be straight as any other, and the best instrument to make it with is a small crooked bistoury.

If the sacculus is already burst, the place of opening is determined, and the orifice may be enlarged with a knife, or dilated.

The incision made, the sacculus should be moderately distended, either with dry lint, or a bit of prepared sponge; by which means an opportunity will be gained in two or three days of knowing the state of the inside of the sac, and of the ductus nasalis: if the former is neither sloughy nor otherwise diseased, and the obstruction in the latter but slight, it sometimes happens, that after a free discharge has been made for some days, and the inflammation occasioned by the first operation is gone off, the sac

[f] I cannot but be of opinion, that in this case, and many other abscesses, the opening which nature makes from within generally heals with less scar or mark than that which is made by a cutting instrument. It is certainly in many cases wrong to let matter remain after it is palpably formed; as in some situations it is capable of doing injury to the parts on which it is situated. I only mean to say, that when matter may be safely left till it makes its own way out, the scar is not so visible as when an opening is artificially made; as, except in those cases where from violent inflammation and distension a sphacelus is induced, the natural opening is rather a distraction than a destruction of fibres, or loss of substance. E.

contracts itself, a superficial dressing, with moderate pressure, heals the sore, the lachrymal fluid resumes its wonted course, and the disease disappears.

Of this I have seen more than one instance, and perhaps it would happen oftener, if the very absurd manner in which this disorder is generally treated after opening the bag, did not prevent it: in this state success is to be expected from the most gentle treatment only: whatever irritates, inflames, or destroys, will infallibly prevent it.

If this simple method does not succeed, or from the state of the parts seems unlikely to do so, another must be tried, which the opening already made will enable us to put in practice: the point to be aimed at is, if possible, to render the nasal duct pervious to the lachrymal fluid; and we must endeavour to obtain this end by such means as give the least pain, excite the least inflammation, and leave the parts as near as possible in their natural state; that is, we are to endeavour to dilate the passage from the sac to the nose, by some means which will gradually distend it without destroying its texture, in the same manner as the dilation of the urethra ought to be effected in the case of strictures, by passing either a probe, or a piece of cat-gut, or a bougie, gently into it, as far as it will easily go, and repeating it occasionally until it is got quite through and the passage is free.[g]

Every man will determine for himself, by what means he will endeavour to accomplish this end; nor is it of very material consequence which he prefers, provided it be done gradually, and without giving pain: a proper dilatation of the upper part of the sacculus by dry lint, or a bit of prepared sponge, will be found useful previous to the attempt toward passing any thing into, or through the duct; and it will also be necessary that the surgeon be possessed of a just idea of the size and direction of it, both in a natural and a diseased state; for whoever has formed one only,

[g] This caution is very necessary to be observed in the cure of strictures of the urethra, in which case the proper intention is gradually to dilate the passage, and to procure an increased discharge of mucus from the lacunæ; this should always be done gently, and by means which give as little pain as possible; whatever irritates or gives pain will certainly do mischief, will add to the obstruction, and increase the dysury.

from viewing its bony channel in a dry scull, will upon experiment find himself much deceived with regard to its diameter in a living subject; the membrane which lines it is not extremely thin, in a healthy state, and when it is inflamed or thickened by obstruction, the passage through the duct is thereby rendered very small, if it is not quite shut up.

They of our ancestors who mistook this discase for an abscess, and found (as indeed they always must) extreme difficulty in filling it up with sound flesh, generally had recourse to escharotic medicines for the destruction of that fungus which seemed to hinder them from accomplishing their end; by which conduct they irritated all the neighbouring parts, increased the inflammation, and were most frequently frustrated in their expectation of a cure at last. The same kind of medicines were also used by those who supposed the disorder to be an encysted tumor, with intention to eradicate the cyst, which, they thought, prevented a cure by remaining behind; and both these methods of practice were vindicable, supposing their idea of the disease had been a true one, which it most undoubtedly was not: their reasoning was right, but their principles were wrong; they were in general very little acquainted with the structure and use of the parts, and totally mistook the nature of the disease.

But now, that we are thoroughly acquainted with both, this kind of practice ought surely to cease, as the preservation of the sacculus and duct, and not their destruction, are, or ought to be intended: all cathæretic medicines must be wrong and prejudicial, at least while the intention is such; an intention at all times rational, and sometimes capable of being fulfilled.

Notwithstanding the destruction of the bag is allowed to be wrong by most surgeons of the present time, yet there are many, who, by their manner of dressing it, after they have opened it, do really, thought not intentionally, produce the same effect as our forefathers aimed at: it is still a custom with many, as soon as it is opened, to distend the cavity of it with a hard tent, or with dossils of lint charged with escharotic medicines, such as mercurius precipitatus ruber, &c. by which means the inflammation is increased, the skin and edges of the incision hardened, and the inside of the sacculus put under the necessity of casting off a

slough. This is one of several instances still remaining of our adhering to old methods of practice, after the principles, on which such methods were originally formed, have been allowed even by ourselves to be erroneous; for this manner of dressing the sore is effectively the same as the ancients made use of, while they supposed the disease to be an abscess of the caruncle, and encysted tumor, or a callous ulcer with carious bone; and was by them intended very properly for the destruction of such callosity, to assist the exfoliation of the supposed caries, and to procure a firm basis to incarn upon.

On the contrary, the point which ought first to be aimed at, immediately after having made an opening into the sac, is to endeavour to remove the obstruction of the natural passage from thence into the nose, by the means already mentioned, which design this method of cramming in escharotic dressings must necessarily frustrate, must frequently render a simple case complex, and at least retard that cure it is designed to expedite.

The only excuse that can be now made for such method of dressing is, that the surgeon is satisfied that the ductus ad nares cannot be restored to its use, and therefore, by destroying part of the sacculus, intends to procure such a generation of new flesh, as may fill up its cavity, and hinder the accumulation or lodgement there in future.

If this was feasible, perhaps it might be a vindication of such treatment; but unfortunately it neither is, nor can be so in general; and whoever will attentively examine the natural situation and structure of the parts concerned, will immediately see why it cannot. All, or the greatest part of the diseased and obstructed duct, lying in its bony channel out of the reach of what is applied to the inside of the sacculus, must prevent the generation of a firm basis at its bottom, and produce a fresh collection of mucus, which in a short space of time lifts up the cicatrix into a new tumor, and requires the same treatment as if nothing at all had been done.

On the other hand, it must not be denied, that now and then a cure has by this means been effected; but it has been so rarely, that it can hardly be admitted as an authority or vindication of so irrational an attempt.

The parts about the eye are most of them of very quick sensa-

tion, and easily irritated; all dressings are in fact extraneous bodies, and therefore, when applied to such parts, cannot be too soft and light: suppuration is an act of nature, not of art; and is always best executed when she is least disturbed: this is a general truth, and will hold good in all parts of the body, even where suppuration may be most wanted: but in the present case, in which the lower part of the sac, and all the duct, are often in such state as not to require any suppuration at all, escharotic dressings of any kind, by producing inflammation both of the eye and caruncle, by rendering the edges of the sore hard or sloughy, and by destroying the communication between the puncta lachrymalia and sacculus, must necessarily counteract the only proper intention of cure.

I would not in this place be thought to mean, that a mere superficial pledget is all the dressing that is required: no; a moderate dilatation of the upper part of the sacculus is at first absolutely necessary, in order to get easily at the duct below; but this should be effected without the use of corrosive applications of any kind, and is best accomplished by prepared sponge, which will distend to almost any degree without destroying.

When a passage has been once obtained, it should be carefully kept open, either by a piece of cat-gut, a small bougie, a leaden probe, or something of that sort; and when it is thoroughly established, the sore may be permitted to contract, until it becomes no more than what serves for the introduction of the bougie into duct; in this state I would advise, that it be kept open for some time, injecting now and then a little aqua calcis, softened with mell. rosar. through from above into the nose; and when it appears that the passage is so free, and so well established, that there is good probability of its preserving itself, the orifice in the angle of the eye, by being covered only by a superficial bit of plaster, or pledget, will contract and close; and if, during its closing, moderate pressure be used on the sacculus, to prevent a fresh accumulation of mucus, it will assist the cure.

Whether the sacculus, in a healthy and undilated state, is endued with any degree of contractile power, which it loses by being distended, or to what other cause it may be owing, I know not; but I have more than once beeen foiled in my attempts towards this

method of curing the disease, by a fresh collection of mucus, notwithstanding the nasal duct has remained open, as appeared by the discharge made into the nose upon pressure on the tumor, the immediate subsidence of the said tumor, and the passage of an injection, or small probe, after having again opened the sac. Some of these have, upon being again healed, remained good cures, and others not; the uncertainty which attends these cases is great, and the event never to be known but by experiment. Whoever says that none of them are to be cured by the foregoing method, errs as much as he would who should expect it to succeed in all. Where the disease is in such state as to admit its being tried, it is very well worth while, as it is not painful nor tedious; and where it does not answer our expectations, it is no hinderance to any other more efficacious one being made use of afterward: in all these cases, different circumstances in the patient, or in the state of the diseased parts, must produce a variation in the necessary treatment, both in general and particular: a bad habit will require the use of internal remedies; the combination of other diseases of the neighbouring parts will add to the difficulty and trouble; and even the fairest, and such as seem most likely to succeed, do sometimes resist this, and indeed every other attempt.

From the necessity of keeping the eye bound while dressings are applied for the dilatation of the sacculus, an inflammation is frequently raised. This, added to the necessary discharge of serum, mucus, &c. is apt to heat and excoriate the parts about; therefore, warm fomentations, cooling collyria, epulotic cerates, and renewing the dressings as often as shall be necessary, with whatever else can contribute towards keeping the skin clean and cool, must be found serviceable as well as pleasant, and should never be neglected.

SECT. IV.

The last state which I mentioned of this disorder is that in which the natural passage from the sacculus to the nose is so diseased as to be quite obliterated, or in which the bones are sometimes found to be carious.

The methods hitherto described have all been calculated to preserve the natural passage, and to derive the lachrymal fluid again through it: in this attempt they are sometimes successful; but when they are not, there is no chirurgical means left, but to attempt the formation of an artificial one in its stead.

The upper and hinder part of the sacculus lachrymalis is firmly attached to the os unguis, a small and very thin bone just within the orbit of the eye; which bone is so situated, that if it be by any means broken through, or removed, the two cavities of the nose and of the orbit communicate with each other, consequently the os unguis forms the partition between the hinder part of the lachrymal bag, and the upper part of the cavity of the nose; and it is by making a breach in this partition that we attempt the formation of an artificial passage for the lachrymal fluid.

This operation, if considered merely as a perforation, is no invention of the moderns; the ancients undoubtedly performed it: but though it was executed much in the same manner as it is now, yet it was not done with the same intention.

From the accounts which our ancestors have left us of the disease in question, it is plain, that they supposed it to be always attended with a degree of callosity, and often with caries, and that the surest way to obtain a cure was to lay the bone bare: this they effected either by caustic or cautery, according to the humour of the surgeon, or the fears of the patient. If caustic applications were used, they waited the separation of the eschar; and if they found, or believed the bone to be altered, they applied an actual cautery to it: if the bone to which the iron was applied was the os unguis, it was too thin to bear much heat, or much pressure, consequently was easily burnt, or broke through, and by that means an opening was made into the nose; a terebra was

also sometimes made use of instead of cautery, and the same effect produced thereby.[h]

By each of these methods, a passage being made from the sacculus lachrymalis into the nose, a cure was sometimes accidentally obtained; but the cautery was applied, either to destroy the supposed callosity, or to desquamate a caries; and the terebra, either for the same reason, or to make a passage for the discharge of matter, which lodged, and as they thought hindered the healing of the sore; for as they were not acquainted with the natural passage of the lachrymal fluid, it would be absurd to suppose, that by means of this perforation they intended the formation of an artificial one. Callosity and caries were their two characteristics of the disease; the dissolution of one, and the exfoliation of the other, were all they had in view from the use of either caustic or cautery, and the perforation of the os unguis was either accidental, or made merely for the discharge of matter.[i]

Indeed, if we attentively consider what the old writers have left us on this subject, it will appear, that though they knew that

[h] Oculo et cæteris junctis partibus bene obtectis, os ferramento adurendum est vehementius: quod si jam carie vexatum est, quo crassior huic squama abscedat, quidam adurentia imponunt. CELSUS.

Cum isto pulvere in veritate fere mortificabam omnes fistulas curabiles, et cum cauterio ferreo, aut æneo—factâ mortificatione tali totius carnis usque ad os, cum pulvere aut unguento superdictis superpone mortificato butyrum et escharâ aspice, et si fuerit os corruptum cauteriza ipsum usque ad ejus profundum. GUL. DE SALICETO.

Postea si homo fuerit delicatus, per istud foramen mittatur Canellus ferreus vel æneus subtilis usque ad profundum si poteris, et per ipsum canellum ferrum candens immitte et fistulæ radices decoque: at si timuerit ignem immitatur pillula de unguento ruptorio. ROLANDUS.

Osse detecto ferrum imprime calidum supra ipsum, et ipsum cauterium mediocriter comprimendo, postea imple totum vulnus cum oleo rosarum misto cum vitello ovi. LANFRANC.

[i] Fabritius ab Aquapendente, who in general copies Paulus, speaks of the perforation as meant only to make a depending orifice for matter, "Post car-"unculæ et loci excisionem, terebra humorem aut pus in nares derivarint." FAB. AB AQUAPENDENTE.

Gul. de Saliceto, and indeed many other of the ancient writers, speak of using both cautery and terebra to the purpose of deriving the matter and sanies which lodge in the sac, into the nose; and, by making a depending orifice, to procure a firm basis to heal on. "Aspice os, et si fuerit corruptum "cauteriza ipsum usque ad ejus profundum, et concavitatem cum cauterio

a passage into the nose was sometimes a consequence of their use of the terebra and cautery, yet the operators had no very accurate knowledge of the parts they made so free with; no precise idea of the bone on which their instruments were applied, or through which they passed; nor of the place most immediately proper for such application of them: sometimes they perforated the os unguis very properly, sometimes the cautery or terebra was thrust into the bony channel of the natural nasal duct, and sometimes they were applied to the nasal process of the maxillary superior: the direction given by most of them to rasp the bone (scalpris abradere) and to impress the cautery with some force, that the bone may be sooner exfoliated, (*ut citius squama abscedat*,) plainly prove, that either they were not aware of the tender structure of the os unguis, or that they did not intend to apply their instruments to it: if the former was the case, the perforation was accidental; if the latter, they must have often done much more harm than good; that is, they must bave burned and destroyed unnecessarily, parts which have little or nothing to do with the disease; and by such treatment of them must have much oftener prevented than accomplished a cure.[k]

The intention of the present practitioners in making this per-

" punctuali, et perfora ipsum ad aliam partem, ejus ut sanies per nasum fluat, " deinde incarnetur et consolidetur." GUL. DE SALICETO.

Indeed, the formation of an artificial passage for the lachrymal fluid could make no part of the intention of those who were not rightly acquainted with the natural one.

Paulus mentions perforation with the terebra as the practice of some in his time; but from what he says, it is plain he did not practise it himself, or think it necessary, and that he regarded it only as a method of making a depending orifice; his words are, " Quod si jam carie vexatum est, ferro candenti, acuto, ac in cuspidem abeunte adurimus spongiâ frigidâ madente oculo imposita.

" Sunt qui post carunculæ excisionem terebra usi humorem aut pus in nares " derivarint; nos autem satis habuimus eousque solum ferramentis ad Ægy- " lopem accommodatis adurere ut squama abscederet."

PAULUS ÆGINETA.—See also FAB. AB AQUAPENDENTE.

[k] Petrus de Marchetti, though perfectly sensible that the os unguis was often broken through by the cautery, yet insists upon it, that it served no other purpose than to hasten exfoliation. " Præterquam quod hujus perfora- " tionis non alius sit usus quam ut os perforatum aut inustum citius abscedat. " Observandum tamen non esse perforandum os nisi præsente maxima ipsius

foration is different from that of our ancestors; but it is more rational, and founded upon the nature and use of the parts concerned in the disease: it is to form and maintain a new artificial passage from the lachrymal bag into the nose, when the natural one can no more be rendered useful, and without any view to any thing else: this, I say, is the aim of them all; but though they are perfectly agreed in their intention, yet they are not so with regard to the instrument which they use, some still continuing the actual cautery, others using other different instruments.

The ancients preferred the cautery, for reasons which have already been assigned; but since the symptoms of callosity and caries have been found to be very infrequent, and the os unguis has been perforated solely with a view to make an artificial passage into the nose, the cautery has with many lost much of its ancient credit, and other instruments have been substituted in its place, which give less pain at the time of using, and leave less deformity afterward.

But though many have laid aside the hot iron, yet it still has its advocates, who prefer it to every other instrument, and who have therefore endeavoured to obviate its inconveniences: they have directed that the cannula through which it passes be made of a conical form, and so large at its lower end, as that they shall not touch each other; they have ordered this cannula to be wrapped round with wet rag, at the time of using it; they have placed a check upon the top of the iron to prevent its point from going too far, and have been particular in directing us to withdraw it as soon as it is got through.

But notwithstanding these and every other caution, the cautery gives great pain at the time of using; it lengthens the attendance, and most commonly produces unnecessary deformity even in the hands of the most dexterous; not to mention the horror occasioned by thrusting a hot iron into the corner of the eye.

When the inconveniences arising from the use of this instru-

"corruptione, sola siquidem ejus superficie corrupta aut altera sat fuerit "partem læsam abradere." PETR. DE MARCHETTI.

And Mr. Verduc, a very modern writer, is also of the same opinion, "Le "mellieur remede pour amorter l'acide qui cause la carie, c'est de passer "legerement un cautre actuel sur l'os sans le percer."

ment, even in the best hands, are important, it may be easily guessed what they must be in those of the clumsy and ignorant; and therefore, unless some real advantage attends it, it ought certainly to be so discouraged, that no one may attempt to revive it. Let us then see with what intent it has been used by those who have appeared most fond of it, and who may fairly be supposed to have best known how to manage it.

The defence made by the wet rag against the heat of the iron, the disproportioned size, and the figure of the cannula, very plainly show, that its effect is designed to be executed by the point only; and the check at the upper end as clearly shows, that that point is designed to pass no farther than just through the bone, while all the ill effects are occasioned by the upper part of the cautery on the eye-lids and angle of the eye. Now, if it be not designed to produce any effect on any of the parts through which it passes down to the bone, but merely to burn through that and the membrana narium, and thereby make an opening into the nose, I do not see how it differs from any other perforator of equal size, except in the mischief it does to the parts above, which it should not affect.

It does indeed burn the bone and membrane, through which it pierces, and thereby prevents the orifice from closing again immediately; and this is certainly the principal end of perforation, by whatever instrument it is performed; but it is also as certain, that the same end is obtainable by means less mischievous and less horrible.

Our ancestors had a very plausible reason for using it: their ideas of callosity and caries always accompanied this disease, and authorised them to make use of such applications as they thought most proper in such cases: but now, when we know that these are symptoms which very rarely occur, or even if they do, that they are removeable in a much easier manner, we are no longer vindicated in continuing an alarming and a painful process, when we can obtain the same end by much gentler means; for whether the membrana narium be burnt through, or divided in any other manner, it is the future method of dressing that opening that must maintain it, let it be made by whatever instrument, or in whatever manner it may.

The late Mr. Chesselden was a warm patron of the cautery, took

a great deal of pains to prevent it from doing mischief, and has said in its defence, that—"other methods of curing this disease "have been much recommended, though often unsuccessful; but "this, well performed, is infallible." After so positive an assertion, I am sorry to be obliged to say that it is contradicted by manifold experience; that there have been many instances of perfect cures performed without the use of a cautery; and that some of those who have been cauterised by Mr. Cheselden himself, have been disappointed in the expectation of one: nor could he, with all the pains he took, prevent the effect of the heat of the iron, or leave his patient without a weeping eye.

The intention is merely to make an opening through the os unguis and membrana narium into the cavity of the nose, and to treat that perforation in such a manner as that it shall most probably remain open, and give passage to the lachrymal fluid from the puncta, after the external sore is healed.

The extreme thinness of the bone renders the passage of the instrument very easy, and if the breach which is made be of any tolerable size, I am inclined to think that it never is filled up again by bone; but that when it is closed, it is by the membrane; and therefore it is the surgeon's business to make a pretty large opening in the bone, and to prevent its being closed again, by rendering the edges of the membrane on each side of it callous.

To make this opening, many different instruments have been devised and used; a large strong probe, an instrument like a common gimlet, a curved trocar, &c. &c. each of which, if dexterously and properly applied, will do the business very well; the one necessary caution is, so to apply whatever instrument is used, that it may pierce through that part of the bone which lies immediately behind the sacculus lachrymalis, and not to push up too far into the nose, for fear of injuring the os spongiosum behind, while it breaks its way.

For my own part, I have always used the curved trocar, which has served my purpose well, and from which I have never experienced any inconvenience: in using it the point should be turned obliquely downward, from the angle of the eye toward the inside of the nose; the accomplishment of the breach will be known by the discharge of blood from the nostril, and of air from the wound

upon blowing the nose. The most precise direction in this part of the operation will be of but little use to him who has no idea of the natural structure and disposition of the parts concerned, and who ought therefore to get such information as soon as he can: but whoever is at all acquainted with this matter, or will attend to the situation and connexion of the os unguis, knows that this bone is divided into two parts by a perpendicular ridge; that the lachrymal sac is connected to all that part which is anterior to this ridge; and that the posterior part of the bone contributes to form the orbit of the eye, and has little or no connexion with the lachrymal sac: the trocar must be applied therefore to that part of the bone which is anterior to the ridge, and consequently behind the lachrymal bag. By the passage of the instrument, all this part of the bone will in all probability be broken, but from which no mischief will ensue.

An attention to the natural situation of these parts will also show the practitioner, that if the point of his instrument be passed in a transverse direction with regard to the nose, the os spongiosum superius will be unnecessarily wounded or broken; and if it goes in too perpendicular a direction, it may get into the channel of the natural duct, and its point will be stopped by bearing against that part of the maxilla superior which contributes to the formation of that channel.

It has been objected to the trocar, that it may break the os unguis to some distance from the place where its immediate point is fixed: to which I can only answer, that I have performed the operation a great number of times, and never yet have seen any inconvenience to arise from it: indeed, a total removal of a small piece of the bone would be a thing rather to be wished for than avoided. If we may reason by analogy, it seems to be a necessary requisite toward preserving a future passage; for we very well know, in a caries of the bones forming the roof of the mouth, that they are sometimes bare for a large compass, and by casting off leave a considerable aperture into the nose; yet in many cases, when the virus is removed, and the habit recruited, that opening will so contract as not to suffer a small quill to pass where you might have introduced your finger, nay often will quite close; and therefore, though the opening made in the os unguis may

possibly in spite of all endeavours be again closed up, yet a free breach in it seems to be the most likely means to prevent it; and upon this principle I have always turned the perforator round very freely whenever I have used it; have never seen any mischief from it; and do attribute the success I have had with it, in some measure, to this method of using it.

As soon as the perforation is made, a tent of lint should be introduced, of such size as to fill the aperture, and so long as to pass through it into the cavity of the nose: this should be permitted to remain in two, three, or four days, till the suppuration of the parts renders its extraction easy; and after that a fresh one should be passed every day, until the clean granulating appearance of the sore makes it probable that the edges of the divided membrane are in the same state. The business now is to prevent the incarnation from closing the orifice, for which purpose the end of the tent may be moistened with spir. vitriol. ten.; or a piece of lunar caustic so included in a quill, as to leave little more than the extremity naked, may at each dressing, or every other, or every third day, be introduced; by which the granulation will be repressed, and the opening maintained: and when this has been done for some little time, a piece of bougie of proper size, or a leaden cannula, may be introduced instead of the tent, and leaving off all other dressing, the sore may be suffered to contract as much as the bougie will permit, which should be of such length, that one extremity of it may lie level with the skin in the corner of the eye, and the other be within the nose.

The longer time the patient can be prevailed upon to wear the bougie, the more likely will be the continuance of the opening; and when it is withdrawn, the external orifice should be covered only by a superficial pledget or plaster, and suffered to heal under moderate pressure.

There is another method which has been much recommended by some French writers to prevent the closing of the opening in the os unguis: which is, to introduce a cannula either of gold or silver, or lead, into the aperture, and to permit the sore to heal over it, suffering the cannula to remain, or to come away by the nose.

For my own part, I cannot say any thing to it, having never had occasion to try it; the cases of this kind which I have had under my direction, having generally succeeded under some of the methods already mentioned; which methods will frequently prove successful, if the surgeon is clear in his attention, pursues it steadily and properly, and refrains from doing too much; though I must again repeat what I have said before, *viz.* that there is no method of treating this disorder which is infallible, none that will absolutely and in all cases prevent a return, especially in scrophulous habits; yet, when a just distinction is made between those cases which are in their own nature incapable of cure, and those which by being improperly treated are not cured, I am inclined to believe, that the number of the former will be found much smaller than it is generally imagined.[i]

[i] It must appear to whoever has perused the foregoing tract, that the author took great pains and bestowed much attention on it. His accurate description of the disease rescued it from the obscurity with which it had been enveloped; and the method of cure which Mr. Pott proposed, was a great improvement on the awkward, painful, and destructive operations which had been practised by Mr. Chesselden, and others of his predecessors.

But I must confess that I never was perfectly satisfied with it: I attended many of these cases with Mr. Pott, and in several the artificial passage through the os unguis became obliterated soon after the bougie was left off, though it had been worn a considerable time; in consequence of which sometimes a fresh collection of mucus was formed, producing inflammation and suppuration. In others, where no great inflammation ensued, the tears, not finding a passage, again took their course down the cheek. It was, however, as before observed, a great amendment on the operations which had preceded, and has laid the foundation of the improvements which have taken place since the time when it was written.

The introduction of metallic tubes, which have been since recommended by other writers, have also been found inadequate to the purpose, as either from the tubes shifting their position, or from their being filled with inspissated mucus, the tears were prevented from passing.

The nail-headed style which Mr. Ware has recommended in his valuable work on the fistula lachrymalis must be allowed to be a great improvement, and in my opinion the best method of treating the complaint. The opening for the introduction of the style is small. The style acts as a capillary tube, by attraction, and readily conducts the tears into the nose—it may be taken out as often as it may be necessary to clean it, and the duct may be washed by a syringe—the style may be worn as long as may be thought necessary, as it creates little disfigurement, appearing only as a small black patch. E.

SOME FEW

GENERAL REMARKS

ON

FRACTURES AND DISLOCATIONS.

ON

FRACTURES AND DISLOCATIONS.

No part of surgery is thought to be so easy to understand, as that which relates to fractures and dislocations. Every the most inexpert and least instructed practitioner, deems himself perfectly qualified to fulfil this part of the chirurgic art; and the majority even of these are affronted by an offer of instruction, on a subject with which they think themselves already so well acquainted.

This is also the opinion of a considerable part of the people. They regard bone-setting (as it is called) as no matter of science; as a thing which the most ignorant farrier may, with the utmost ease, become soon and perfectly master of; nay, that he may receive it from his father and family as a kind of heritage. We all remember the great, though short-lived reputation, of the late Mrs. Mapp. We all remember, that even the absurdity and impracticability of her own promises and engagements were by no means equal to the expectations and credulity of those who ran after her; that is, of all ranks and degrees of people, from the lowest labourer or mechanic, up to those of the most exalted rank and station; several of whom not only did not hesitate to believe implicitly the most extravagant assertions of an ignorant, illiberal woman; but even solicited her company; and, at least, seemed to be pleased with her conversation.

The desire of health and ease, like that of money, seems to put all understandings, and all men, upon a level; the avaricious are duped by every bubble; the lame and the unhealthy by every quack. Each party resigns his understanding; swallows greedily, and for a time believes implicitly, the most groundless, ill-founded,

and delusory promises; and nothing but loss and disappointment ever produce conviction. Arts, trades, and manufactures, are allowed to be learnt, in general, by those who have employed a proper quantity of time and attention in such pursuits; and it seems most singularly unjust, as well as untrue, to suppose that medical people are the only part of mankind who are all either so dull as not to be able to learn; or so profligately wicked, as not to practise their art to the best of their judgment, and to the greatest possible advantage to mankind. Surely there are, and always have been among us, as well as in all other classes, men truly able and perfectly honest; men, who well understand the science which they profess; and who practise it not only with great ability, but with strict integrity. I cannot be supposed to say or to mean this as a vindication of every individual. Different men have different powers and capacities. The multitude with us, as with all ranks and degrees, (not excepting any,) will always be deficient. Advancements in knowledge will always be owing to the ingenuity and industry of a few particular people; but such advancements will always, in due time, more or less influence the rest. They have so done; and notwithstanding that there remains a great deal yet to be done, to bring surgery to that degree of perfection of which it is capable, yet whoever will compare the present practice of it with that of a very few years ago, cannot justly, or with any degree of candour, withhold his commendation from his contemporaries.

I remember, some years ago, to have heard a judge from the bench tell a jury, that he believed a country bone-setter knew full as much, if not more of the matter of his own business, than any, the most eminent surgeon in the kingdom. I will not enter into a disquisition concerning the validity of a judge's opinion. Perhaps his lordship might very little understand the thing concerning which he decided so peremptorily: without either injustice or partiality, I may certainly suppose him to have been a much more able lawyer than surgeon; and I believe it will also be allowed, that general reflexions of this kind are, and must be, the consequences of a petulant attempt to be witty, rather than of conviction; and therefore, at best, are frivolous and idle. But, on the other hand, I am very willing to allow (what indeed I have already

allowed) that many parts of surgery are still capable of considerable improvement; and this part, perhaps, as much as, if not more than, any; it being one of those in which a general observance of, and rigid adherence to, old prescribed rules, have prevented the majority of practitioners from venturing to think for themselves; and have induced them to go on in a beaten track, from which they might not only safely, but advantageously deviate.

The general doctrine, relative to fractures, is contained under the following heads, as parts of the treatment of them:

Extension.
Counter-extension.
Coaptation, or setting.
Application of medicaments.
Deligation, or bandage.
Position.
Prevention, or relief of accidents.

This is the general arrangement of the subject by most of the writers on it, and a very just and proper one it is; but notwithstanding the parade of books under these various heads, much less alteration will be met with, since the times of Hippocrates, Galen, and Celsus, than an inquirer might expect, or than the subject is capable of.

I must desire that what I have said may not be misconstrued. I do not mean that there are not, and have not at all times, been men of particular ingenuity, who have deviated from the common methods, and have greatly improved the art; but still the common methods are the same, and the multitude of practitioners religiously follow them. Let me not therefore be charged with presumption or arrogance, if I say, that under almost every of the foregoing heads the practice is capable of considerable improvements—improvements, which would show rationality and sense in the surgeon, and produce ease and convenience to the patient.

I am aware that some of my readers may be inclined to charge me with affecting to deviate from the commonly prescribed rules;

and to contradict opinions, which a great length of time, and a long successsion of writers have given sanction to.

——————————————— "Quæ
"Imberbes didicere, senes perdenda fateri;"

is a hard lesson sometimes to human vanity, and what requires some degree of candour to learn. But, on the other hand, if it was not now and then practised, I know not how such an art as surgery (whose basis is experience) could ever be improved. Our ancestors deserve our best thanks for the assistance which they have given us: where we find them to be right, we are obliged to embrace their opinions as truths; but implicit faith is not required from man to man; and our reverence for our predecessors must not prevent us from using our own judgments. Ancient and modern are mere sounds, and can signify nothing in this case, unless with the former we can connect an idea of truth established and confirmed by time and experience, and with the latter, that of demonstrable improvement upon what has gone before.

If what I have to urge is not capable of being verified and confirmed by experience, it must sink into nothing; but if, upon trial, it shall be found by the majority (as it has been by me and some others) to be not only true and practicable, but highly conducive to the ease and benefit of the afflicted, it ought to have as much weight, though delivered by a living writer, as if it had proceeded from the remotest antiquity: its use, not its date, should give it value. If practitioners, since the time of Albucasis, had been contented with his doctrine, and never had ventured to think for themselves, surgery had not been what it now is, and its great merit would still have consisted in the multiplicity of its hot irons. In short, to such as think that we are seldom or never to deviate from the opinions and practice of those who have gone before us, I shall take the liberty of answering in the words of the great Mr. Locke, who says, "The floating of other men's "opinions in our brains, makes us not one jot the more know-"ing, though they happen to be true. And beaten tracks lead "those whose thoughts reach only to imitation," 'Non quo eun-'dem est, sed quo itur.'

Before I enter on the subject, the reader will give me leave to acquaint him, that it is by no means my intention to write a regular treatise on fractures, although I think the subject well deserving of, and even requiring one. I only mean to throw out a few hints, which I hope may prove intelligible and useful.

The first article, in the general arrangement, is extension; under which may also be comprehended the second, or counter-extension.

In order to accomplish this, we are directed, if the fracture be of the thigh or leg, to place the patient in a supine posture, and the broken limb in a straight one; then, having the upper part of it held firm and steady, by proper assistants, we are ordered, by means of hands, ligatures, lacs, or even in some cases by pieces of machinery, to make such an extension or stretching of the limb lengthways, as shall enable the surgeon to place the ends of the broken bone in as apt, that is, in as even a position, with regard to each other, as the nature of the fracture will admit. This is a short description of what, in the vulgar phrase, is called setting a broken bone; and is most commonly a painful operation to the patient, a fatiguing one to the operator and his assistants; and what is worse, is, in many instances, found to be inefficacious; at least, not fully to answer the intention of the one, or the expectation of the other.[a]

Writers in general are very precise and formal in the directions which they have given for the due and proper accomplish-

[a] "Instruments for extension are threefold; first, the surgeon's hands, &c.; "secondly, funes and habenæ, a sort of bandage fit to pluck at, in order for "extension; thirdly, there are organa and machinemata, engines used by us, "and invented by the ancients."

WISEMAN.

The very mention of funes, habenæ, organa, and machinemata, implies a force exceeding that of mere hands; a degree of force, which in a fracture never can be wanted if the limb be rightly placed; a degree of force which must, in the nature of things, do mischief; and a degree of force, whose whole effect, however great, must cease immediately upon its being removed; unless the fracture be particularly and luckily circumstanced.

There are not wanting instances of the muscles surrounding a bad though simple fracture, having been torn by extension; and spasm and other mischief thereby produced. See cautions on this subject, laid down by many old writers, particularly by Galen and Albucasis.

ment of this purpose. They have told us, that the extension should be made slowly and gradually; and should be continued till the ends of the bone are separated from each other sufficiently to admit of the fracture being set without risk of breaking off any points or inequalities, and to enable us to place them perfectly smooth and even. All this, like many other of the preceptive parts of physic and surgery, is very pretty on paper, but not often found to be practicable in the chamber. The direction to continue the extension until the ends of the bones are at a certain distance, lengthways from each other, plainly implies a considerable degree of violence; the limb must by such force be not only made longer than its fellow, or than nature ever intended it should be, but this procrustian method of lengthening it is ordered to be executed while the limb is in such position as to put all the muscles most on the stretch, and render them least likely to yield to it. Now, not to say a word of the great probability of the points and edges of the fracture wounding the surrounding muscles, or of such wounds being more painful, or worse in their consequences, when inflicted on parts thus stretched, or of the addition that such force must make to the laceration already necessarily made by the fracture; I say, not to mention a word of all this, can the method itself (without considering any accidental, adjunct circumstances) be practised in every fracture, or even in the majority of fractures? Will it be done properly by the rude, the inattentive, and the ignorant? If attempted by such, will it not be, is it not, frequently productive of pain, tumefaction, inflammation, and extravasation; which are set to the account of the nature of the fracture, and to inevitable necessity? and when done ever so properly, will it, can it, in an oblique or splintered fracture, answer the purpose it is intended for, or produce a more happy coaptation?

Whence arise these evils? from whence proceed the difficulty and the so frequent disappointment?

In order to understand this rightly, let us for a moment consider, what is or ought to be meant by the terms extension and counter-extension, and why they become necessary: for if the greater part of the pain attending such method, and the frequency of disappointment, both to patient and surgeon, should be found to arise from this part of the process; and that such part can be

either disused without prejudice; or altered with advantage, we ought to think ourselves happy in having it in our power to correct our error.

Neither extension, nor counter-extension, can ever be necessary, on account of the mere fracture, considered abstractedly. The broken ends of the bone or bones are of themselves inactive; and, if not acted upon by other parts, they would always remain motionless. When any attempt is made to put them into motion, they of themselves can make no possible resistance; nor can any be made on their part, save an accidental one arising from the points of the fracture being entangled with each other; and when they have been once, by the hand of the surgeon, placed properly and evenly with regard to each other, they would of themselves for ever remain so. What then is the reason why fractured bones always suffer a greater or a less degree of displacement? why is a broken limb almost always shorter than its fellow? what creates the resistance which we always find in attempting to bring the fractured parts aptly together? whence does it proceed, that when we have done all that is in our power, (according to this mode of acting,) the ends of the fracture will, in many cases, become again displaced, and lameness and deformity frequently ensue? In short, what are the parts or powers which act on the bones, and which, by so acting on them, produce all these consequences?

These parts are the muscles, the only moving powers in the animal body. By the action of these on the bones, all locomotion is performed, and cannot be performed without them; and although all bones, when broken, are in some degree displaced and shortened, yet it will always be found, that in proportion as the muscles surrounding, or in connexion with a bone, are strong or numerous, or put into action by inadvertence or spasm, so will the displacement of the ends of such bone, when fractured, be. The even and smooth position of the fractured ends of a tibia, when the fibula of the same leg is entire and unhurt; that is, when the muscles therefore cannot act upon the former; the visible and immediate deformity, when both the before mentioned bones are broken nearly in the same place; that is, when the muscles can act upon, and displace such fracture; the great difficulty frequently met with, in endeavouring to get a broken os femoris to

lie even tolerably smooth, and to prevent such broken limb from being much shorter than the other, are, among others which might be produced, such strong, and irrefragable proofs, as need no comment.

From the muscles then, and from them only, proceeds all the difficulty which we meet with in making our extension; and by the resistance of these, and of these only, are we prevented from being always able to put the ends of a fractured bone immediately into the most apt contact.

Let us in the next place consider, what it is which gives to a muscle, or to the principal muscles of a limb, the greatest power of resisting any force applied to them *ab externo*, in order to draw them out into greater length; for whatever that is, the same thing will be found to be the cause of the different degrees of resistance in setting a fracture.

Does not the putting the muscles in a state of tension, or into a state approaching nearly to that of tension, almost necessarily produce this effect? or, in other words, does not that position of a limb, which puts its muscles into, or nearly into such a state, give such muscles an opportunity of exerting their greatest power either of action or of resistance? This I believe cannot be denied. On the other hand, what is the state or position of a muscle which is most likely to prevent it from acting, and to deprive it most of its power of resistance? or what is that position of a limb, which, in the case of a broken bone, will most incapacitate the muscles from acting on, and displacing it; and in the greatest degree remove that resistance which they have it in their power to make to the attempts for the reduction of such fracture? Is it not obvious, that putting a limb into such position as shall relax the whole set of muscles belonging to or in connexion with the broken bone, must best answer such purpose? Nothing surely can be more evident. If this be granted, will it not, must it not follow, that such posture of a broken limb must be the best for making the reduction; that is, it must be that in which the muscles will resist the least, and be least likely to be injured; that in which the broken bone will be most easily set, the patient suffer least pain in present, and that from which future lameness and deformity will be least likely to happen. A little attention to

what frequently occurs, may perhaps serve to illustrate and confirm this doctrine better than mere assertion.

What is the reason why no man, however superficially acquainted with his art, ever finds much trouble in setting a fractured os humeri, and that with very little pain, and a very small degree of extension? Is it not because both patient and surgeon concur in putting the arm into a state of flexion; that is, into such a state as relaxes all the muscles surrounding the broken bone? and is it not for the same reason that we so very seldom see (comparatively speaking of this bone with others) a deformity in consequence of a fracture of it? Let the reduction be attempted with the arm extended from the body, and the difficulty of setting will be much increased: let the arm be deposited in an extended straight position, and the fracture will be displaced and lie uneven.

Apply the same kind of reasoning to the os femoris; that bone whose fracture so often lames the patient and disgraces the surgeon.

Will it not be more cogent, and more conclusive, in proportion as the muscles in connexion with this bone are more numerous and stronger?

I would ask any man, who has been much conversant with accidents of this kind, what is the posture which almost every person (whose os femoris has been newly broken) puts himself into in order to obtain ease, until he gets proper assistance? Do such people stretch out their limb, and place their leg and thigh straight, and resting on the calf and heel? I believe seldom or never. On the contrary, do not such people almost always bend their knee, and lay the broken thigh on its outside? And is not the reason, why this must be the most easy posture, obvious?

From want of attention to, or from not understanding these few self-evident principles, many people permit their patients to suffer considerable inconvenience, both present and future.

It is a maxim universally taught and received, that a fractured limb may be in such state, as not to admit of the extension necessary for its being set; that is, if assistance be not at hand, when the accident happens; if they who bring the patient home, do it so awkwardly or rudely as to bruise and hurt the part; if from drunkenness, folly, or obstinacy in the patient, it happens that the

limb is so disordered that it is found to be much swollen, inflamed, and painful, it is allowed not to be in a state to admit extension.

This, I say, is a general maxim, and founded upon very just principles; but what is the general practice in consequence of it? It is, to place the limb in an extended, straight position, to secure it in that, and then by proper means, such as fomentation, poultice, &c. to endeavour to remove the tension and tumor. Now, if it be considered that the swollen, indurated, and inflamed state of the muscles is the circumstance which renders extension improper, surely it must be obvious, that such position of the limb as necessarily puts these very muscles in some degree on the stretch, must be a very improper one for the accomplishment of what ought to be aimed at. Under this method of treatment, the space of time which passes in the removal of the tension, is sometimes considerable; so considerable that a happy and an even coaptation becomes afterwards impracticable; and then this accident, which nine times in ten is capable of immediate relief, is urged as an excuse for unnecessary lameness and deformity.

How then are we to conduct ourselves in such circumstances? The nature of the complaint points out the relief. Extension is wrong; a straight position of the thigh or leg is a degree of extension, and a still greater degree of it in proportion as the muscles are in such circumstances as to be less capable of bearing it. Change of posture then must be the remedy, or rather the placing the limb in such manner as to relax all its muscles, must be the most obvious and certain method of relieving all the ills arising from a tense state of them; which change of posture will be attended with another circumstance of very great consequence; which is, that the bones may in such posture be immediately set, and not one moment's time be thereby lost; a circumstance of great advantage indeed! for, whatever may be the popular or prevailing opinion, it is demonstrably true, that a broken bone cannot be too soon put to rights; as must appear to every one who will for a moment consider the necessary state of the muscles, tendons, and membranes surrounding, and the medullary organs contained within a large bone broken and unset; that is, lying in an uneven irregular manner. Can any truth be more clear, than that if the fracture, tension, and tumefaction be such that the mus-

cles cannot bear to be stretched out in the manner necessary for setting the broken bone without causing great pain, and perhaps bringing on still worse symptoms, the more the position of that limb makes its muscles approach toward a state of tension, the less likely it must be that such symptoms should remit, and the longer it must be before the wished-for alteration can happen; and consequently, that while the accomplishment of such purpose is by every other means aimed at, the position of the limb ought most certainly to contribute to, and not to counteract it? In short, if the experiment of change of posture be fairly and properly made, the objections to immediate reduction, from tension, tumour, &c. will most frequently be found to be groundless; and the fracture will be capable of being put to rights, as well at first as at any distance of time afterward.[b]

Extension having been made, and the broken ends of the bone having been placed as smooth and as even as the nature of the

[b] Mr Pott's recommendation, to lose no time before a broken bone is reduced or set, ought to be adopted by every practitioner; and I earnestly advise, that whoever is sent for to a fractured bone, should never leave it until he has set it, or placed it in the best possible position. I have often heard surgeons say they did not attempt to set a fracture at first, because there was too much inflammation; and I have, in such cases, found the limb lying on a pillow, without even the support of a splint, or at best with a splint placed under a thick pillow, where it could not act; as if splints were entirely useless until the fracture was perfectly reduced. This is a very serious error; for supposing the bones not completely set, splints, properly applied, must undoubtedly give some stability, and tend, in some degree, to prevent the motion of the broken bone until it is set; and which effect must be lost through the intervention of a pillow. I will not say, that after a certain time has passed subsequent to the accident, and owing to some of the circumstances which Mr. Pott has enumerated, a limb may not be so disordered, so swollen, inflamed, and painful, that it would be imprudent, and probably impossible, immediately to alter its position. In that case, we must wait, until, by the assistance of fomentations, poultices, or other proper applications, a favourable alteration takes place; but these circumstances must indeed be very pressing, and the inflammation very great, which can warrant the not endeavouring to get the ends of the bones into a proper position the first time of seeing the fracture; as it is a true and positive fact, that what is most likely to reduce the swelling and inflammation, and far beyond all topical applications, is the even and happy position of the ends of the broken bones. E.

case will admit, the next circumstance to be attended to is the application of some medicament to the limb; particularly to the fractured part of it. In this, different people act differently. Some make use of an adhesive, or what they choose to call a roborant plaster; some, of what is commonly called a cerecloth; others apply spirit. vini, with oil, vinegar, and white of egg; and others the spirit. mindereri, the solution of crude sal ammoniac in vinegar and water, or some such kind of medicine.

To the cerecloth, provided it neither sticks to the skin, nor is capable of irritating it, there can be no objection; neither can there be any to all the others, except the adhesive plaster: that must for ever be wrong upon every rational principle. The intention in applying any kind of external medicine to a broken limb, is, or ought to be, to repress inflammation, to disperse extravasated blood, to keep the skin lax, moist, and perspirable, and at the same time to afford some, though very small, degree of restraint or confinement to the fracture, but not to bind or press; and it should also be calculated as much as possible to prevent itching, an herpetic eruption, or an erysipelatous efflorescence. Adhesive plasters of all kinds, let the composition of them be what it may, are, from this one quality, the least likely to contribute to any of the good ends proposed, and the most likely to be the cause of the contrary inconveniences, which ought most carefully to be avoided. They obstruct perspiration, they heat the skin, they produce itching, eruption, and inflammation; and if the fracture be quite surrounded by them, and the limb be from any cause ever so little inclined to swell, they make a tight, painful, and pernicious stricture, much greater even than a roller, and less likely to relax. At St. Bartholomew's hospital, we use a cerate made by a solution of lytharge in vinegar, which, with soap, oil, and wax, is afterward formed into such consistence as just to admit being spread without warming.

This lies very easy, repels inflammation, is not adherent, comes off clean, and very seldom if ever irritates, or causes either herpes or erysipelas. But let the form and composition of the application made to the limb be what it may, one thing is clear; *viz.* that it should be put on in such manner, as that it may be renewed and shifted as often as may be necessary, without moving the limb in

any manner: it being certain, that when once a broken thigh or leg has been properly put to rights, and has been deposited properly on the pillow, it ought not ever be lifted up or moved from it again without necessity, until the fracture is perfectly united; and it is as true, that such necessity will not very often occur. This may perhaps seem strange to those who are accustomed to roll simple fractures, and consequently to lift them up every three or four days, in order to renew such kind of bandage: but the necessity of this motion arises merely from the kind of bandage made use of, and not from any circumstance of the fracture itself. That the frequent motion of a fractured limb cannot possibly contribute to the ease of the patient, will I suppose, be readily admitted; as I suppose also it will, that when a broken limb has been once deposited in the best position possible, it is impossible to mend that position; merely by taking such limb up and laying it down again; from whence it must follow, that such kind of apparatus as necessitates the surgeon frequently to disturb the limb, cannot be so good as one that does not; provided the latter will accomplish the same kind of cure as the former: the truth of which position will appear in the most satisfactory manner to any who will take a view of the method in which simple fractures are treated at the before-mentioned hospital. Such application having been made as the surgeon thinks right, the next thing to be done is to put on a proper bandage. That used by the ancients, and by the majority of the present practitioners, is what is commonly called a roller. This is of different length, according to the surgeon's choice, or as it may be used in the form of one, two, or more pieces. Hippocrates used three[c]; Celsus, six; but the present people seldom use more than one. By such kind of bandage three intentions are aimed at, and said to be accomplished; *viz.* to confine the fracture, to repress or prevent a flux of humours, and to regulate the callus[d]: but whoever will reflect seriously on this

[c] See on this subject Fab. ab Aquapendente, Wiseman, Scultetus, Hildanus, Petit, Du Verney.

[d] "On applique la premiere sur l'endroit meme de la fracture. Son "milieu doit repondre au centre. On fait trois tours circulaires: ce qui "sert affermir cet endroit, qui est le seul qui ait besoin d'etre assujetti, "comme etant le seul qui peut se deranger, *et a contenir le suc nourricier, et*

matter will soon be convinced, that although some sort of bandage is necessary in every simple fracture, as well for preserving some degree of steadiness to the limb, as for the retention of the applications, yet none, nor neither of these three ends can be answered merely, or even principally, by bandage of any kind whatever; and therefore, if this should be found to be true—that is, if it should appear that whatever kind of deligation be made use of, it cannot be a principal, but only an accessorial kind of assistance, and that in a small degree, and very little to be depended upon—it will follow, that such kind of bandage as is most difficult to be applied with justness and exactitude, such as is soonest relaxed and out of order, such as stands most frequently in need of renewal, and in such renewal is most likely to give pain and trouble, must be more improper and less eligible than one which is more easily applied, less liable to be out of order, and which can be adjusted without moving the limb.

The ancient method of applying the roller in case of simple fracture of the leg or thigh, was to make[e] four or five turns round the fracture first, and then to continue the bandage upward and downward, until the whole limb was enveloped properly. This was done in this manner with a double view; to keep the broken ends of the bone in their place, and to prevent the influx of humour. Modern practitioners, although they have the same ends in view, generally begin their bandage from the inferior extremity of the limb, and continue it up to the top. Whether the old or the later method be followed, whether one or more rollers be made use of, the whole is executed while the limb is kept by means of the assistants in the same extended posture in which the coaptation was made, so that the whole bandage is finished before the leg is deposited on the pillow; in the doing all which, if from the tired state of the surgeon,[f] or either of his assistants, or if from the

"*empecher qu'il ne s'echappe trop abondamment et trop irregulierement a l'entour*
"*de la fracture; ce qui feroit un cal tres difforme.*"

Du Verney.

[e] See a particular account of this in Fab. ab. Aquapendente, and in Sergeant Wiseman.

[f] The extraordinary length of time used by some in putting a fracture to rights, renders what I have called the *tired state of the assissants* an object of

awkwardness, or unhandiness of any of the parties concerned, the true and exact position of the limb be at all deviated from, the ends of the bone will again be in some degree displaced, and the bandage, instead of being of use, will become prejudicial, by pressing hard on the inequalities of the fracture: to which let me add, that the roller, especially when applied to a leg, if it be not put on with due dexterity, that is, if it do not sit perfectly smooth and even, is the most unequal and worst kind of bandage in use.

These objections, however just, are not the least to which the roller in the case of simple fracture of the leg or thigh are liable; for, as I have already hinted, it must in a very short space of time, even while the parts surrounding the fracture are in the most tender and most painful state, be renewed, and that more than once, which renewal cannot be executed without again taking the limb off from the pillow, again committing it to the hands of assistants, and again running a risk of displacing the fracture: all which, not to mention the repetition of pain to the patient every time such operation is performed, and which must be at least every four or five days, are (as I have already said) very material objections to the roller, even in the most judicious and dexterous hands, and still more so in those of the rude and ignorant.

The prevention of a flux of humours to a broken limb by bandage, is a common phrase; but they who use it, have either no idea at all annexed to it, or a very erroneous one.

If by the points and edges of the broken bone, the muscles and membranes be unavoidably wounded and torn, or if the same kind of mischief be incurred by the inadvertence or indiscretion of the patient, or of those who assisted in getting him home, or from the violence used in extending the limb and setting the fracture, inflammation must be excited, and pain and tumefaction will be the consequence; and these will continue for some time in every fracture; but that space will be longer or shorter in different cases and under different circumstances: evacuation, rest, and a favourable

importance. The good position of the fracture depends as much or more on them than on the surgeon. If the assistant who holds the foot varies from the proper manner, I defy the surgeon to redress the fracture without the concurrence of such assistant.

position of the limb, will, and do in general, remove all these complaints; but bandage can contribute nothing more than by keeping the applications in their proper place; so far from it, that if the bandage be a roller, it must by the frequent necessity of its being adjusted, and the frequent motion of the limb, in some degree counteract the proper intention of cure.

The old writers are in general very precise as to the number of days during which the roller should be suffered to remain without being shifted; and the number of times which such shifting should be repeated within the first fortnight.[g] This exactitude is by no means necessary; but if the bandage be supposed to be of any use at all, it is obvious, that it ought to be renewed or adjusted as often as it may cease to perform the office for which it is designed, or whenever it shall be found to counteract such office; that is, as often as it shall become so slack as not to contain the fracture at all; or whenever the limb shall be so swollen, that the roller makes an improper degree of stricture. The former generally occurs every four or five days: the latter is most frequent within the first week.

In most of the writers on the subject of fractures, we also find marks or signs laid down for our information concerning the due or undue effect of the bandage on the limb. They tell us, that when that part of it which is below the termination of the roller does not swell at all, that the bandage is not sufficiently strict, and will not retain the fracture; that when the same part is considerably swollen, or tense, or inflamed, it implies, that the binding is too straight; and that a moderate degree of tumefaction is a sign that the deligation is properly executed.[h]

[g] "Tertio die a deligatione facta, Hippocrates fascias resolvit, &c. Facta "bona deligatura et pruritu non insectante, a tertio usque ad septimum oportet ægrum deligatum detinere.

"Septimo membrum rursus solvendum, perfundendum aqua tepida, et "ligandum.

FAB. AB AQUAPENDENTE.

[h] See on this Fab. ab Aquapendente, who speaks or rather copies the sentiments of Hippocrates and Celsus. "Terminus in stringendo debet esse "bona laborantis tolerantia: ut deligatum leviter premat, et sic tum contineat "et stabiliat fracturam, tum humores exprimat. Sunt etiam alia hujus signa, "quæ altero die apparent; si enim æger eo die quo deligatus sentiat se valen-

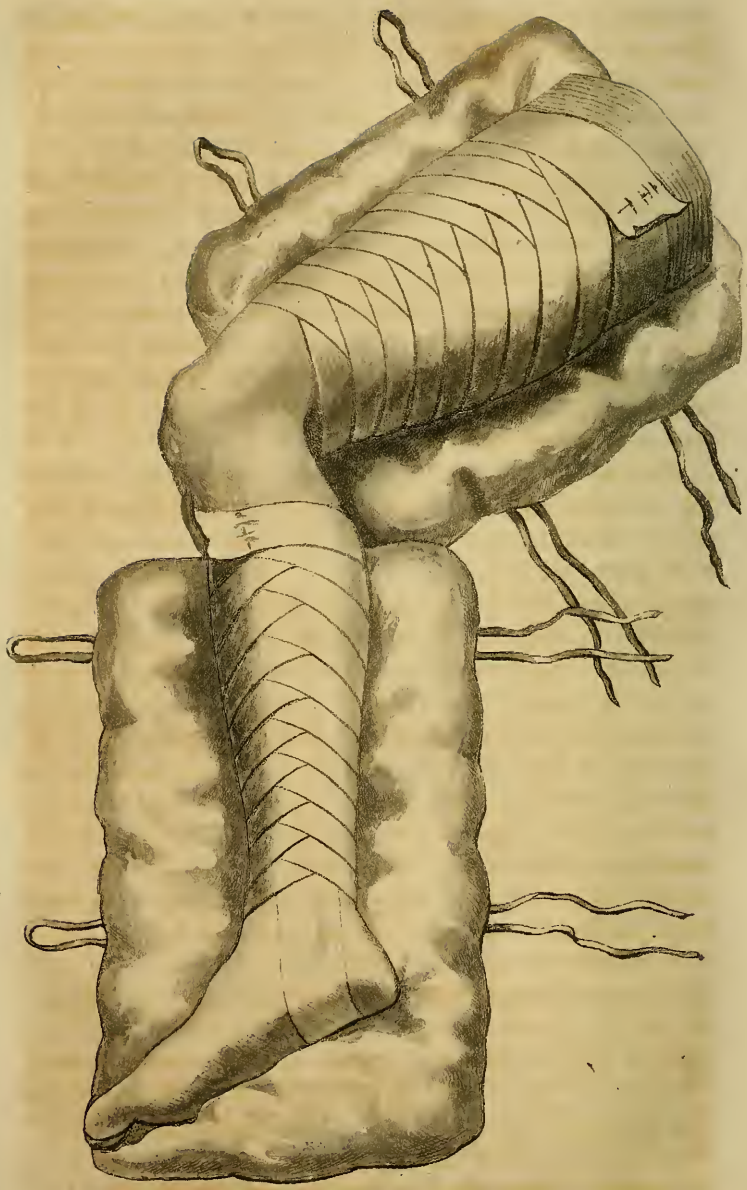
In consequence of these precepts, many practitioners look more anxiously after this degree of tumefaction, than after the true and exact position of the limb; and cannot be induced to believe, that any thing can be wrong under this appearance; although, if they would for once assume the liberty of thinking for themselves, they might be convinced, that even this degree of swelling is wrong; that it implies some kind of obstruction to the circulation, and cannot serve any good purpose; and consequently, that as far as it may be supposed to be the effect of bandage, so far that bandage must be faulty.

The third purpose for which the roller is said to be used, is the regulation and restraint of the callus.

If we were to form our notion of callus by what the generality of writers have said on this subject, we should suppose, that it was not only a particular juice always ready for the purpose, but that, if not restrained and regulated by art, it would always flow in such quantity, as to create trouble and deformity; that there were specific remedies for increasing or decreasing it; and that it always required the hand and art of surgery to manage it. That the callus is so far a particular juice, as that it consists of whatever is destined to circulate through the bones for their particular nourishment, is beyond all doubt; and that this gelatinous kind of fluid is the medium by which fractures are united, is as true; but that it requires art to manage it, or that art is in general capable of managing and directing it, is by no means true. That this callus or uniting medium does oftentimes create tumefaction and deformity, or even lameness, is true also; but the fault in these cases does not lie in the mere redundance of such juice; it is derived from the nature of the fracture, from the inequality of it when set, and from the inapt position of the broken ends with regard to each other; nor is surgery or the surgeon any otherwise

" tius stringi, postero vero die tumor laxus, mollis et parvus appareat, bona
" est deligatio, quia jam humores a parte fracta sunt expressi. Si vero aut
" nullus tumor aut magnus et durus postridie in manu vel pede appareat, pra-
" va est deligatura; quia illa non continet, hæc vero nimis arcta est et inflam-
" mationem movet. Id notandum, fascias magis stringi debere in parte fracta
" quam alibi, ut pars fracta magis illæsa servetur, ab humorum defluxu."

blamable in this case, than as it was or was not originally in their power to have placed them better. It is the inequality of the fracture which makes both the real and apparent redundance of callus, and the tumefaction in the place of union. When a bone has been broken transversely, or nearly so, and its inequalities are therefore neither many nor great, when such broken parts have been happily and properly coaptated, and proper methods have been used to keep them constantly and steadily in such state of coaptation, the divided parts unite by the intervention of the circulating juice, just as the softer parts do, allowing a different space of time for different texture and consistence. When the union of a broken bone under such circumstances has been procured, the place where such union has been made will be very little perceptible; it will be no deformity, nor will it occasion any inconvenience. It will indeed be discoverable, like a cicatrix of a wound in a softer part; but there will be no redundance of callus, because none will be wanted: neither will there be any necessity for any particular management, on the part of the surgeon, to repress or keep it in order. But when a bone has been broken very obliquely or very unequally, when the parts of a fracture are so circumstanced as not to admit of exact coaptation, when such exact coaptation as the fracture perhaps would have admitted has not been judiciously made, when, from unmanageableness, inadvertence, or spasm, the proper position of the limb has not been attended to or preserved, in all such cases there must be considerable inequality of surface; there must be risings on one side, and depressions on another; and in such cases the juices circulating through the bone, cannot accomplish the union in the same quantity, the same time, or in the same manner. The broken parts not being applied exactly to each other, there cannot be the same aptitude to unite; and according to the greater or less degree of exactitude in the coaptation, that is, according as the ends of the bones are, or have been placed more or less even with regard to each other, will the inconvenience and the deformity be; and still more where the fracture is not set at all: but the broken ends of the bone unite laterally, or by touching each other's sides. The reason of all this is so obvious, without having recourse to a particular specific juice under the name of callus, that it would be



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an insult upon the reader's understanding to explain it further.[i] The periosteum covering every fracture will remain thickened for some time, and a degree of fulness or rising will be thereby caused about the place where such fracture has been united; but time, and the use of the muscles, soon in general remove this.

In short this doctrine of callus, considered as a particular kind of juice, and as being liable to great redundance if not prevented by art, has not only misled many people, but has often been made use of as a cover to ignorance and neglect. When lameness and deformity have been the consequences of one or both these causes, more than of the nature and circumstances of a fracture, the callus has been found ready at hand to take the blame; and the ideal exuberance of this cement has often been urged as an excuse for real want of knowledge, or for gross neglect.

The best and most useful bandage for a simple fracture of the leg or thigh, is what is commonly known by the name of the eighteen-tailed bandage,[k] or rather one made on the same principle, but with a little difference in the disposition of the pieces. The common method is to make it so, that the parts which are to surround the limb, make a right angle with that which runs lengthways under it; instead of which, if they are tacked on so as to make an acute angle, they will fold over each other in an oblique direction, and thereby sit more neatly and more securely, as the parts will thereby have more connexion with and more dependence on each other. In compound fractures, as they are called, every body sees and acknowledges the utility of this kind of bandage preferable to the roller, and for very obvious and convincing reasons, but particularly because it does not become necessary to lift up and disturb the limb every time it is dressed, or every time the bandage loosens.

The pain attending motion in a compound fracture, the circum-

[i] On the subject of callus, the editor of Du Verney tells a story from Galen, and which himself seems not to disbelieve, *viz.* that a callus in a particular case was so redundant as to transude through the skin, and to keep the compresses constantly wet.

[k] Perhaps more properly the many-tailed bandage, as the number of tails or ends must depend on the length of the limb, and other circumstances relative to the fracture. E.

stance of the wound, and the greater degree of instability of parts thereby produced, are certainly very good reasons for dressing such wound with a bandage, which does not render motion necessary; but I should be glad to know what can make it necessary, or right, or eligible, to move a limb in the case of simple fracture? what benefit can be proposed by it? what utility can be drawn from it? When a broken bone has been well set, and the limb well placed, what possible advantage can arise from moving it? surely none; but, on the contrary, pain and probable mischief. Is it not the one great intention to procure unition? Can moving the limb every two or three days contribute to such intention? Must it not on the contrary obstruct and retard it? Is not perfect quietude as necessary towards the union of the bone in a simple as in a compound fracture? It is true, that in the one there is a wound which requires to be dressed, and the motion of the limb may in general be attended with rather more pain than in the other: but does motion in the simple fracture give ease, or procure more expeditious union?

Every benefit then which can be supposed to be obtained from the use of the common bandage or roller, is equally attainable from the use of that which I have just mentioned, with one additional, and, to the patient, most invaluable advantage; *viz.* that of never finding it necessary to have his leg or thigh once during the cure removed from the pillow on which it has been properly deposited. In short, to quit reasoning and speak to fact, it is the constant practice at St. Bartholomew's, and attended with all possible success. We always use the eighteen-tailed bandage; and never move the limb to renew or adjust it.[1]

The parts of the general apparatus for a simple fracture, which come next in order, are the splints.

These are generally made of pasteboard, wood, or some resisting kind of stuff, and are ordered to be applied lengthways on the broken limb; in some cases three, in others four; for the more steady and quiet detention of the fracture.

That splints properly made and judiciously applied are very

[1] See the different opinions of different French practitioners, with their reasons on this subject, in Du Verney, Traité des Maladies des Os.

serviceable, is beyond all doubt; but their utility depends much on their size and the manner in which they are applied.

In general practice, they are made of such length, as not to reach either upward or downward, so far as the roller extends; not to comprehend either the upper or the lower joint of the broken bone, and to exceed the fracture either way not many inches. They do not, for example, in the broken leg comprehend either the joint of the knee, or the joint of the ancle, and act only on the fracture.[m]

In this manner of application, and of this size, they are in fact neither more nor less than compresses, and compresses made of very bad materials. All the good that ever is, or that can be done by them, when of such length and so applied, might certainly be done in a better manner by a more proper kind of compress; and every disadvantage, which a hard resisting compress, injudiciously applied, is capable of producing, is probable to result from them thus used.

[m] This is the old doctrine, and has been almost universally and constantly adhered to and followed. Our forefathers, finding that such splints as they used and applied in their manner excited pain and inflammation, did not use, but forbade them until after seven days were past, and the first inflammation, as they thought, was over.

After this, they put them on to strengthen the fracture, as they said, and therefore made them short for that purpose only, expressly cautioning us against the only method of applying them (in the case of a broken leg) in which they can be really useful; *viz.* that in which they comprehend both the knee and ancle.

"Ferularum usus idem est ac pannorum ad fractum os continendum, ut "maneat immotum, etiamsi membrum universum moveatur.

"Jubet Hippocrates leves esse ferulas et æquales et ad extrema resi-"mas, &c.

"Sed et *breviores ferulas* esse præcipit *ipsa vinctura*, ne quando cutem "proximam tentare valeant eminentem plerumque ob humores receptos, "quos fasciæ exturbant. Id quoque cavere oportet, ne ad ossium eminentias, "quales in ima tibia et sura sunt, ferulæ pertingant," &c. &c. &c.

ORIBASIUS *de Fracturis.*

"Sed hoc tempore (post septimum diem) vice plagularum oportet ferulas "opponere.

"His utebatur Hippocrates demum post septimum diem; quia ante septi-"mum magis urgebat intentio arcendæ inflammationis, quam intentio stabili-"endi fracturam; post septimum autem contra accidit."

FAB. AB AQUAPENDENTE.

The true and proper use of splints is, to preserve steadiness in the whole limb, without compressing the fracture at all. By the former they become very assistant to the curative intention; by the latter they are very capable of causing pain and other inconveniences; at the same time that they cannot, in the nature of things, contribute to the steadiness of the limb.

In order to be of any real use at all, splints should, in the case of a broken leg, reach above the knee and below the ancle; should be only two in number; and should be so guarded with tow, rag, or cotton, that they should press only on the joints, and not at all on the fracture.

By this they become really serviceable; but a short splint, which extends only a little above and a little below the fracture, and does not take in the two joints, is an absurdity; and, what is worse, it is a mischievous absurdity.

By pressing on both joints, they keep not only them but the foot steady; by pressing on the fracture only, they cannot retain it in its place, if the foot be in the smallest degree displaced; but they may, and frequently do occasion mischief, by rudely pressing the parts covering the fracture against the edges and inequalities of it.

I suppose it will be said, that although short splints do not of themselves sustain and keep steady the two joints, and consequently the limb, yet that purpose in the broken leg may be, and is, fulfilled by junks, fanons, and other contrivances. To which I answer, that then the short splints are in that case of no use at all, and had better be laid aside: they should be used for no other purpose, but that of keeping the limb steady; and, if they do not answer that end, they are an incumbrance, and multiply the articles in the apparatus for a fractured leg very unnecessarily.

In the case of a fractured os femoris, if the limb be laid in an extended posture, one splint should certainly reach from the hip to the outer ancle, and another (somewhat shorter) should extend from the groin to the inner ancle. In the case of a broken tibia and fibula, there never can be occasion for more than two splints, one of which should extend from above the knee to below the ancle on one side, and the other splint should do the same on the

other side. The manner of applying them, if the limb be deposited in a state of flexion, will come under the next article.

This, and indeed the most essential article in the treatment of a fracture, is the position of the limb. Upon the judicious or injudicious, the proper or improper execution of this, depends the ease of the patient during his confinement, and the free use and natural appearance of his limb afterward.

If I meant to describe, or if I approved (pardon the phrase) the common method of placing the broken leg and thigh in a straight manner, this would be the place to mention the many very ingenious contrivances and pieces of machinery, which practitioners, both ancient and modern, have invented for the purpose of keeping the whole limb straight and steady; that is, of keeping all the muscles surrounding the fractured bone constantly upon the stretch, and at the same time of preventing any inequality in the union of it, and any shortening of the limb, in consequence of such inequality.

But as it is my intention by these sheets to inculcate another, and as it appears to me a better disposition of the limb, in which such boxes, cradles, and pieces of machinery are not wanted, nor can be used, it is needless for me to say any thing about them.

According to this plan the fractured leg and thigh should be deposited on the pillow, in the very posture in which the extension was made, and the fracture set; that is, with the knee bent.

I have already been so explicit, or perhaps prolix, on the tense or lax state of the muscles, as depending on posture, under the head of extension, that I shall spare the reader, as well as myself, a good deal of trouble by referring back to that article. All that is there urged, or that can be urged for making the extension, that is, for setting a fracture in such disposition of a limb or its muscles, is equally powerful and conclusive with regard to the manner of depositing and leaving it after it has been set. Whatever renders reduction and coaptation easy, must as necessarily maintain ease during the confinement, preserve rectitude of figure, and prevent displacement. The same principle must act on both occasions; and whether the doctrine be right or wrong, considered by itself, it must be equally so in both circumstances; that is, in the manner of setting a fracture, and in the manner of depositing

the limb afterward.[n] In the case of the fractured os humeri, the only position in which it can with any tolerable convenience to the patient be placed, is, with the elbow bent, that very position which necessarily relaxes and removes all the resistance of the surrounding muscles. Daily experience evinces the utility of this, by our very seldom meeting with lameness or deformity after it, notwithstanding the prevailing apprehension of exuberant callus.

The deformity frequently consequent to the fracture of the bones of the cubit, particularly that of the radius only, will generally, if not always, be found to be in proportion as the muscles concerned in the pronation and supination of the hand happen to be put more or less into a state of action, or tension, by the position of the limb.

In the thigh, the case is still more obvious, as the muscles are still more numerous and stronger.

The straight posture puts the majority of them into action, by which action that part of the broken bone, which is next to the knee, is pulled upward, and by passing more or less underneath that part which is next to the hip, makes an inequality or rising in the broken part, and produces a shortness of the limb.

In the fracture of both bones of the leg, the case is still the same; a straight position puts the muscles upon endeavouring to act; a moderate flexion of the knee relaxes them, and takes off such propensity.[o]

The disposition, therefore, of the broken cubit ought to be that which, by putting the hand into a middle state between pronation and supination, and by bending the fingers moderately, keeps the radius superior to the ulna; or in other words, the palm of the hand should be applied to the breast, the thumb should be supe-

[n] It has been said, that the straight position of a limb, by putting the muscles on the stretch, induces them to contribute to the security of the fracture against displacement. If this be the case in general, how happens it that those bones are always found most liable to be displaced when broken, and to be most difficult to keep in their proper place, which are surrounded by the most, and by the strongest muscles?

[o] In proportion as the fracture shall happen to be more or less oblique, the truth of this doctrine will, upon experiment, be found to be more or less apparent, as well as useful.

rior, the little finger inferior; and the hand should be kept in this posture constantly by means of two splints; which should reach from the joint of the elbow on each side, and should be extended below the fingers; or the same purpose may be still better answered by a simple neat contrivance of the very ingenious Mr. Gooch of Norfolk; of which he has given a draft, and which is preferable to a common splint, by its admitting the fingers to be more easily bent.

The position of the fractured os femoris should be on its outside, resting on the great trochanter; the patient's whole body should be inclined to the same side; the knee should be in a middle state, between perfect flexion and extension, or half bent; the leg and foot lying on their outside also, should be well supported by smooth pillows, and should be rather higher in their level than the thigh; one very broad splint of deal, hollowed out, and well covered with wool,[p] rag, or tow, should be placed under the

[p] If the pillow on which the broken thigh is placed be not too thick, the splint may with equal advantage be placed underneath such pillow, and in many cases this will be found to be the best manner of using it.*

* Of late years Mr. Pott was not partial to the use of pillows; and I have often heard him object to their being placed between the splint and the limb; indeed, in general, our intentions are better effected without any. I would take the liberty to recommend, in fractures of the leg or thigh, so soon as the bones are set, and the limb placed in a proper position on a splint, that it be gently laid on the bed, previously made firm, smooth, and level. In this manner it lies on a foundation to be depended on: if a pillow be placed under a fractured leg, it elevates it above the level of the body, and the thigh remains unsupported. If another be placed under the thigh, though it may in some measure obviate this inconvenience, it is very liable to be displaced. In general, the elevation of the leg, so far from being necessary, is prejudicial; the limb will lie with much more ease and security when on a level with the pelvis: the bed therefore cannot be made too flat. If it be thought necessary to raise the limb higher, in order to serve any particular purpose, pillows or double blankets may be very conveniently placed under the bed: by these means a broad steady basis will still be preserved for the support of the fractured limb. With regard to applying pillows between the limb and the splint, I must observe, that they cannot be thus used to advantage, as they take from the proper stability and pressure of the splint, and give the fractured ends of the bones too much play. The nearer and closer the splints are to the limb the better, provided they are prevented from galling by the interposition of some soft substance, such as tow or rag. E.

thigh, from above the trochanter, quite below the knee; and another, somewhat shorter, should extend from the groin below the knee on the inside, or rather in this posture on the upper side; the bandage should be of the eighteen-tail kind; and when the bone has been set, and the thigh well placed on the pillow, it should not, without necessity (which necessity in this m thod will seldom occur) be ever moved from it again until the fracture is united; and this union will always be accomplished in more or less time, in proportion as the limb shall have been more or less disturbed.

In the fracture of the fibula only, the position is not of much consequence; because, by the tibia remaining entire, the figure of the leg is preserved, and extension quite unnecessary; but still, even here, the laying the leg on its side, instead of on the calf, is attended with one very good consequence; *viz.* that the confinement of the knee, in a moderately bent position, does not render it so incapable of flexion and use afterward, as the straight or extended position of it does; and consequently that the patient will be much sooner able to walk, whose leg has been kept in the former posture, than he whose leg has been confined in the latter.

In the fracture of both tibia and fibula, the knee should be moderately bent, the thigh, body, and leg, in the same position as in the broken thigh. If common splints be used, one should be placed underneath the leg, extending from above the knee to below the ancle, the foot being properly supported by pillows, bolsters, &c.; and another splint of the same length should be placed on the upper side, comprehending both joints in the same manner; which disposition of splints ought always to be observed, as to their length, if the leg be laid extended in the common way, only changing the nominal position of them, as the posture of the leg is changed, and calling what is inferior in one case, exterior in the other; and what is superior in one, in the other inferior.[1]

[1] All writers on this subject agree in giving us cautions about defending the heel, and filling up the hollow from it to the calf of the leg; and this they do on account of the pain, excoriation, and even ulceration, which sometimes attend the straight position, with the limb resting on the heel.

Many of them have also taken notice of an accident sometimes attendant

If Mr. Sharpe's splints be made use of, there is in one of them a provision for the more easy support of the foot and ancle, by an excavation in, and a prolongation of the lower or fibular splint, for the purpose of keeping the foot steady.

I hope that I have expressed my meaning clearly; I should be very sorry to be mistaken, because it appears to me to be a matter of some consequence; and if what I have said be intelligible, the reader will understand from thence, that I mean to signify that (in my opinion) extension will in general be made with more facility, and coaptation more happily executed; that a patient will suffer a great deal less pain during these operations, as well as during the necessary confinement for a broken leg or thigh; and that both patient and surgeon will be less likely to be disappointed in their intention and wish; that is, that the former will be less liable to lameness or deformity, when a fractured thigh or leg has been treated in the way I have described, than in the common one.

The resistance necessarily made by the muscles, joined to the great instability of parts in every species of fractured leg or thigh, except in the few where the bones are broken transversely, has constantly exercised the invention and ingenuity of practitioners, in devising means to prevent inequality in the callus, as it is called, and shortness and deformity of the limb. Our books abound with draughts and descriptions of machines for this purpose; ligatures, pullies, leaden weights, and fracture-boxes, so constructed as to overcome and constantly to resist that action of the muscles surrounding the broken bone, that natural tendency in them to contract, which the extended position of the limb necessarily induces. Every body who has been conversant with matters of this sort knows, that even the best of these various contrivances often prove successless; and every one who will reflect ever so little may see why they must be so. That they do prove ineffectual, the number of deformed legs and shortened thighs, which are daily met with, evinces; and that they must frequently

on a broken leg, but which really ought to be set to the account of the posture in which such a leg is placed, more than to that of the fracture: I mean the shrinking or wasting of the calf.

prove so will be obvious to every one, who will consider that the effect can last no longer than the cause is continued, unless there happens to be some very favourable circumstance in the fracture itself. What I mean is this, when the reduction of the fracture is set about, the limb is put into such position, that the surrounding muscles resist the extending force very considerably, and this in proportion to their strength and number; that force is continued and increased till the muscles give way; and the resistance being overcome, an opportunity is thereby obtained of placing the ends of the fracture in as apt position with regard to each other as the nature of it will admit. If the fracture be of the transverse kind; that is, if the ends of the broken bone be large, and afford a good deal of space for contact with each other, such apposition will contribute a good deal to the keeping the limb steady, and the fracture even; but if the fracture be of the oblique kind, if there be several loose pieces, and consequently neither large contact nor stability from the apposition, or if due extension has not been made, or could not, or if the ends of the bones have not been judiciously and properly set, the muscles will act as soon as the extension is relaxed, the fracture will be more or less displaced, according to the nature of it, the limb will be shortened, the time of union will be prolonged, and the place of it (the callus, as it is called) will be in proportion more or less unequal.

I take it for granted that it will be asked, Have not our ancestors in all times happily redressed fractured legs and thighs, by the method which they have delivered down to us, and which in the preceding pages I have taken the liberty to object to? Have not such limbs frequently been rendered as straight, as useful, and as little deformed as possible? I answer, most certainly, yes; it is an undoubted truth, and cannot be denied. But in my turn, let me be permitted to ask, whether in the same method great and even unsurmountable difficulty is not frequently met with? Whether in many cases the act of setting, as it is called, is not excessively painful at the time, and productive of inflammation and other disagreeable symptoms afterward? and whether, in spite of all care, of every contrivance, of every species of machinery which has yet been used, broken thighs and legs are not often, very

often, left deformed, crooked, and shortened, and that merely from the action of the muscles, and the obliquity or shattered state of the fracture? The fact is notorious, and the sole question is, whether or no a different disposition of the parts preventing such action and such resistance, will in many instances prevent these evils? To which, from repeated experience, I answer, Yes. If this should be found to be the case in general, of which I make no doubt that it is; if by this method, many of such unfortunate cases, as in the common method of treatment, disappoint both patient and surgeon, should be found in general to succeed so well as to satisfy both, it will prove all I wish it should prove. Superior utility and more frequent success are all I contend for.

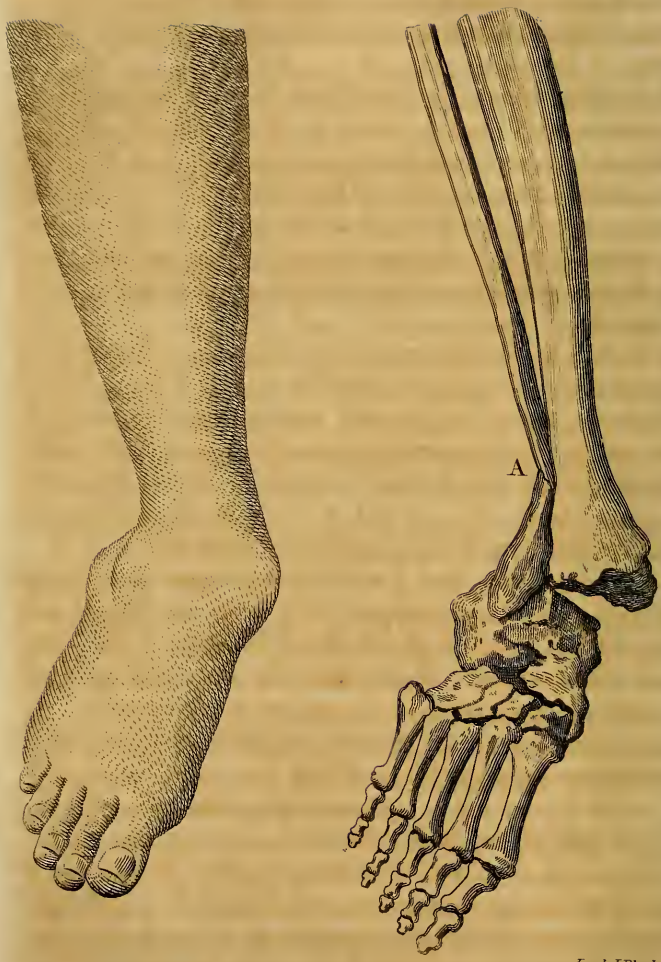
Many people did very well under amputation before the double incision was practised; but is the double incision therefore no improvement? The operation for the bubonocele may be performed with that clumsy instrument the probe scissors, but is the bistoury therefore not preferable? A surgeon may cut off some ounces, or even pounds of flesh from a patient's backside, in order to cure a sinus, but is the cure by the simple division of that sinus therefore not easier or more expeditious? Neither of these can (I think) be proved, unless it can at the same time be proved, that pain is no evil, confinement not at all irksome, and that deformity and elegance of figure are synonymous terms.

Let not the reader fancy that I would dare to amuse him with speculation, or merely specious reasoning on a subject like this. What I have said is from experience, repeated experience both of myself and of others, for a considerable length of time past, and on a great variety of subjects; from an experience which has perfectly satisfied me, and I think will every man who will make the trial fairly and candidly. I do not pretend to say, that by these means every kind of broken bone will infallibly and certainly be brought to lie smooth, even, and of proper length; if I did, they who are versed in these things would know that I said too much: but I will say, (what is sufficient for my purpose,) that it will not only succeed in all those, in which the old method can ever be successful; but also in the majority of those in which it is not, nor in the nature of things can. In those fortunate cases, in which either method will do, the old one is fatiguing,

inconvenient, and even sometimes offensive, from the supine and confined posture of the patient; whereas, that which is here proposed, gives the patient much greater liberty of motion for every purpose either of choice or necessity; and in many of those cases, wherein the old method proves most frequently so far successless, as to leave the limb short, lame, or deformed, I say, in most of these, the proposed method will not be attended with these inconveniencies.

I have already said, that in most cases of broken thigh or leg, the method just described will be attended with great success: but there is one particular case in which its utility is still more conspicuous; a case which, according to the general manner of treating it, gives infinite pain and trouble both to the patient and surgeon, and very frequently ends in the lameness and disappointment of the former, and the disgrace and concern of the latter—I mean the fracture of the fibula attended with a dislocation of the tibia.

Whoever will take a view of the leg of a skeleton, will see that although the fibula be a very small and slender bone, and very inconsiderable in strength, when compared with the tibia, yet the support of the lower joint of that limb (the ancle) depends so much on this slender bone, that without it the body would not be upheld, nor locomotion performed, without hazard of dislocation every moment. The lower extremity of this bone, which descends considerably below that end of the tibia, is by strong and inelastic ligaments firmly connected with the last-named bone, and with the astragalus, or that bone of the tarsus which is principally concerned in forming the joint of the ancle. This lower extremity of the fibula has, in its posterior part, a superficial sulcus for the lodgement and passage of the tendons of the peronei muscles, which are here tied down by strong ligamentous capsulæ, and have their action so determined from this point or angle, that the smallest degree of variation from it, in consequence of external force, must necessarily have considerable effect on the motions they are designed to execute, and consequently distort the foot. Let it also be considered, that upon the due and natural state of the joint of the ancle, that is, upon the exact and proper disposition of the tibia and fibula, both with regard to each other and to the astra-



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galus, depend the just disposition and proper action of several other muscles of the foot and toes; such as the gastrocnemii, the tibialis anticus and posticus, the flexor pollicis longus, and the flexor digitorum pedis longus, as must appear demonstrably to any man who will first dissect, and then attentively consider these parts.

If the tibia and fibula be both broken, they are both generally displaced in such manner, that the inferior extremity, or that connected with the foot, is drawn under that part of the fractured bone which is connected with the knee; making by this means a deformed, unequal tumefaction in the fractured part, and rendering the broken limb shorter than it ought to be, or than its fellow. And this is generally the case, let the fracture be in what part of the leg it may.

If the tibia only be broken, and no act of violence, indiscretion, or inadvertence be committed, either on the part of the patient or of those who conduct him, the limb most commonly preserves its figure and length; the same thing generally happens if the fibula only be broken, in all that part of it which is superior to letter *A* in the annexed figure, or in any part of it between its upper extremity, and within two or three inches of its lower one.

I have already said, and it will obviously appear to every one who examines it, that the support of the body, and the due and proper use and execution of the office of the joint of the ancle, depend almost entirely on the perpendicular bearing of the tibia upon the astragalus, and on its firm connexion with the fibula. If either of these be perverted or prevented, so that the former bone is forced from its just and perpendicular position on the astragalus; or if it be separated by violence from its connexion with the latter, the joint of the ancle will suffer a partial dislocation internally;[r] which partial dislocation cannot happen without not only a considerable extension, or perhaps laceration of the bursal ligament of the joint, which is lax and weak, but a laceration of those strong tendinous ligaments, which connect the lower end of the tibia with the astragalus and os calcis, and which constitute in great measure the ligamentous strength of the joint of the ancle.

[r] See the figure at the preceding page.

This is the case, when, by leaping or jumping, the fibula breaks in the weak part already mentioned; that is, within two or three inches of its lower extremity. When this happens, the inferior fractured end of the fibula falls inward toward the tibia, that extremity of the bone which forms the outer ancle is turned somewhat outward and upward, and the tibia having lost its proper support, and not being of itself capable of steadily preserving its true perpendicular bearing, is forced off from the astragalus inwards, by which means the weak bursal, or common ligament of the joint, is violently stretched, if not torn, and the strong ones, which fasten the tibia to the astragalus and os calcis, are always lacerated; thus producing at the same time a perfect fracture and a partial dislocation, to which is sometimes added a wound in the integuments, made by the bone at the inner ancle. By this means, and indeed as a necessary consequence, all the tendons which pass behind or under, or are attached to the extremities of the tibia and fibula, or os calcis, have their natural direction and disposition so altered, that, instead of performing their appointed actions, they all contribute to the distortion of the foot, and that by turning it outward and upward.

When this accident is accompanied, as it sometimes is, with a wound of the integuments of the inner ancle, and that made by the protrusion of the bone, it not infrequently ends in a fatal gangrene, unless prevented by timely amputation, though I have several times seen it do very well without. But in its most simple state, unaccompanied with any wound, it is extremely troublesome to put to rights, still more so to keep it in order, and unless managed with address and skill, is very frequently productive both of lameness and deformity ever after.

After what has been said, a further explanation why this is so is unnecessary. Whoever will take even a cursory view of the disposition of the parts, will see that it must be so. By the fracture of the fibula, the dilatation of the bursal ligament of the joint, and the rupture of those which should tie the end of the tibia firmly to the astragalus and os calcis, the perpendicular bearing of the tibia on the astragalus is lost, and the foot becomes distorted; by this distortion, the direction and action of all the muscles already recited are so altered, that it becomes (in the usual way of

treating this case) a difficult matter to reduce the joint, and, the support of the fibula being gone, a more difficult one to keep it in its place after reduction. If it be attempted with compress and strict bandage, the consequence often is a very troublesome, as well as painful ulceration of the inner ancle, which very ulceration becomes itself a reason why such kind of pressure and bandage can be no longer continued; and if the bone be not kept in its place, the lameness and deformity are such, as to be very fatiguing to the patient, and to oblige him to wear a shoe with an iron, or a laced buskin, or something of that sort, for a great while, or perhaps for life.

All this trouble, pain, difficulty, and inconvenience, are occasioned by putting and keeping the limb in such position as necessarily puts the muscles into action, or into a state of resistance, which in this case is the same. This occasions the difficulty in reduction, and the difficulty in keeping it reduced; this distorts the foot, and by pulling it outward and upward makes that deformity which always accompanies such accident: but if the position of the limb be changed, if, by laying it on its outside, with the knee moderately bent, the muscles forming the calf of the leg, and those which pass behind the fibula and under the os calcis are all put into a state of relaxation and non-resistance, all this difficulty and trouble do in general vanish immediately; the foot may easily be placed right, the joint reduced, and by maintaining the same disposition of the limb, every thing will in general succeed very happily, as I have many times experienced.

Two kinds of fracture there are, and only two that I can recollect (relative to the limbs) which do not admit of the bent position of the joints; I mean that of the processus olecranon at the elbow, and that of the patella: in these a straight position of the arm and leg is necessary; in the former to keep the fractured parts in contact till they are united; in the latter, to bring them as near to each other as may best serve the purpose of walking afterward.[a]

With regard to the fracture of the patella, an opinion has long

[a] Although a straight position of the limb is necessary for the broken patella, yet this very position becomes so upon the same principle, as renders

and generally prevailed, which seems to me to have no foundation in truth, or (when duly considered) even in probability; it is, that the great degree of stiffness in the joint of the knee, which is sometimes found to be the consequence of this kind of fracture, is owing to, or produced by, a quantity of callus falling into it from the edges of the broken bone; and that the nearer the broken pieces are brought to each other, the more likely such consequence is.

Every part of this doctrine seems equally absurd. In the first place, the fractured bone is by no means capable of supplying such a quantity of callus as to produce this end, unless it may be supposed to run from it as solder from a plumber's ladle; in the second place, if this was the case, the most likely and indeed the only probable way of preventing the deposition of such juice, must be by bringing the broken pieces into close contact; and in the third place, there is no authority, from the appearance of such joints after death, (at least as far as my experience goes,) to suppose this to be the case, or to countenance such opinion. The cause therefore of this rigidity, which is now and then found to attend the broken patella, must be sought for elsewhere; *viz.* in the long rest and confinement of the joint as a means used by many to procure exact union; in mischief done to the ligament, which is formed by the united tendons of the four extensor muscles of the leg, at the time of and by the fracture; and in the na-

the bent posture most advantageous in the broken tibia and femur; *viz.* the relaxation of the muscles and tendons attached to the fractured bone.

Whoever will for a moment attend to the disposition of the pieces in a patella, which has been broken transversely, will see how little necessary or useful the many contrivances of bandages, straps, compresses, buckles, buttons, &c. to be found in writers are, especially all that part of them which are applied to the inferior fragment.

By the action of the united tendons of the extensores muscles of the leg, the superior fragment is pulled upward and separated from the inferior, but the latter remains nearly, if not absolutely, where it was before the accident: there is nothing to act upon it, and therefore it cannot, nor does it move.

The extension of the leg puts the muscles attached to the upper part of the broken bone into a state of relaxation, and prevents their acting; and though a small compress just above this piece, with a moderate bandage, may be useful toward retaining it, yet it is the position of the leg which must keep the broken piece down, and effect the cure.

ture of the fracture itself, that is, the manner in which the bone shall happen to be broken.

But, be all this as it may, the fact undoubtedly is, that they walk best after such accident, whose patella has been broken transversely, and that into two nearly equal fragments; whose confinement to the bed has been short, that is, no longer than while the inflammation lasted; whose knee, after such period, has been daily and moderately moved; and in whom the broken pieces are not brought into exact contact, but lie at some small distance from each other.[t]

[t] It has been suggested to me that there is an obscurity in this passage, and that Mr. Pott's doctrine with regard to the fractured patella is not clearly understood; in consequence of which, his authority has been quoted for giving motion to the joint soon after the accident, and for keeping the divided parts of the patella separate from each other to a great distance. Whoever has conceived this to be Mr. Pott's meaning, has certainly been mistaken, as his practice differed very materially from it. As the passage mentions, that the confinement need not be longer than while the inflammation lasts, the time which is proposed to keep the limb quiet after the accident is perhaps not sufficiently definite, nor expressed with Mr. Pott's usual precision, as frequently only a small degree of inflammation is excited, particularly in those cases where the knee does not reach the ground, which often happens. Every one conversant in business must have seen instances of this fact, where the bone is torn asunder by the mere force of the extensor muscles: it has happened to a person standing firm, and reaching for something on a high shelf, by which posture those muscles are put into strong action, as must be evident to any one who will make the experiment; in these cases there is no external injury, and frequently little inflammation follows the fracture. Are we then immediately to move the limb, and keep the parts of the bone separate? Certainly not. Mr. Pott only meant to caution against too strict and too long confinement; and his constant practice was, to lay the leg in a perfectly straight posture, to elevate the heel, and, by a moderate bandage and compress, to bring down the superior portion of the patella. In this position he usually kept it near three weeks, after which time he allowed of a small degree of motion, which he recommended to be gradually increased.

In fractures of this bone, it is not always in our power to bring the divided parts into contact, consequently there will be a space, which will be supplied with ligamentous substance, as the osseous fibres are here sparingly produced. In proportion to the distance between the two parts of the bone, the chord or tendon on which the extensor muscles act, must be longer than when the bone is in its perfect state, and the muscular power must be proportionally lessened. This should certainly be avoided as much as possible, and can only be

I cannot take leave of this subject of simple fractures, without mentioning a circumstance relative to them, which although, when rightly understood, is of little or no importance, yet, by being misunderstood, becomes frequently of considerable consequence.

I mean, the use of the term, *rising end of a broken bone.*

By the expression, any one unacquainted with these things would be inclined to think, that the prominent part of a broken bone rose, or was elevated from its natural place; and became by such rising superior to the other part or extremity of the fracture. This would certainly be the idea of an ignorant person, and as such would be of little consequence; but by the practice of many, who call themselves surgeons, it is as certainly their idea also, and this renders it a matter of great consequence. Many instances are producible, in which our conduct is in great measure regulated by the language which we use. Having no ideas annexed to our words, leads us into absurdity and unintelligibility; but false ones influence us still more, and frequently produce very material errors.

The fistula lachrymalis, the fistula in perineo, and that in ano, are glaring proofs of this; and my present subject is full as much so: for upon the erroneous idea annexed to the term *rising end*, stands all the absurd practice of compress, bolster, and strict bandage in the cases of simple fracture.[u]

avoided by bringing the parts as nearly as may be into contact. Unless this union be in some degree preserved, the muscles will have too little power on the ligament which is inserted in the tibia, although they contract to the greatest possible degree; consequently, the person, whose patella is much elongated, is obliged to depend principally on the flexor muscles of the thigh and the weight of the leg itself, to bring it forward in progression, which is performed in a most awkward manner, and is found particularly inconvenient in going up and down stairs. If both patellæ have been broken, and are in the same lengthened state, the person is generally obliged to ascend and descend sideways. E.

[u] I was some few years ago carried by a surgeon, since dead, to see a contrivance of his own to keep down the rising end of a broken tibia. It was somewhat upon the principle of Petit's tourniquet, and calculated to act by compression. I told him my opinion freely, but the inventor was wedded to his invention; and the first simple fracture he applied it to he thereby converted into a compound one, by pressing the bone through the skin.

The truth is, that there is really no *rising end* to a broken bone; I mean, when applied, as the term usually is, to the leg, thigh, and clavicle. There is indeed a superior or prominent end or part, and an inferior or depressed one; but the former of these is in its proper place, from which it cannot by art be moved; and the latter, which is not in its proper place, is very capable by art of being put into it.

Perhaps this may to some appear a mere play of words, a nominal distinction, without real difference; but when the influence which a right or wrong idea of this produces on practice is attended to, the consequence will be obvious and serious.

When a collar bone, os femoris, or tibia and fibula are broken, by the action of the muscles, by the motions of the patient, and by the mere weight of the inferior part of the arm, thigh, or leg, the fractured ends of such bones are displaced, and always displaced in such manner, that the inequality occasioned necessarily by such displacement, proceeds from the inferior end of the fractured bone being retracted or drawn under the superior: this produces a tumefaction or unequal rising; and the upper extremity of the fracture is therefore called the rising end of it. Now the man who regards this rising end as that part of the fracture which has by such rising got out of its place, and not as having accidentally become the prominent part merely by the insinuation or retraction of the other part underneath it, will go to work with bolster, compress, and bandage, in order to bring and keep such end down; by which means he will give his patient considerable pain, and, while he depends on such means alone, will most certainly be frustrated in his intention and expectation, the means not being adequate to the proposed end. But the man who looks on this in the true light, that is, who looks on the superior part as being in its proper place, and the inferior as being displaced by the weight of the limb and the action of the muscles, will know, that, by the mere position of such limb, he shall be able to remedy all the inconvenience and deformity, as far as they are by art capable of remedy, without the parade or the fatigue of useless apparatus.

He will, for example, know that the prominent part of a broken clavicle, that part of it which is next to the sternum, is just

where it should be; and that the inferior part, that which is connected with the scapula, is out of its place, by being drawn down by the weight of the arm; and, therefore, instead of loading, as is usual, the prominent part with quantities of compress, which never can do any service, he, by a proper elevation of the arm, will bring the lower end upward into contact with the other; and thereby, with very little trouble, easily accomplish what he never can do in any other manner, however operose.

The same thing will happen, from the same principles, in the leg and thigh: a prominence, or a rising end, there always will be; but that rising end is never to be brought down by any pressure from compress or bandage: the fallen or inferior one must always be brought up to it by the proper position of the rest of the limb: this will always remove the inequality as far as it is removeable, and nothing else can.[x]

[x] In a professed regular treatise on this subject, it would be right to take notice of what may be called the infortunia or accidental evils, which sometimes accompany even simple fractures; such are, disease arising from injury done to the medullary membrane, within the bones, in bad habits; hæmorrhage, or a species of spurious aneurism, from a wound of the interoseal artery, between the tibia and fibula, or of either of the carpal arteries; mischief from the fracture becoming accidentally the seat of the crisis of a fever; deficiency of callus, or the accident of the broken bone not uniting; the fractured limb becoming the seat of an erysipelas, terminating in a slough of the common membrane and periosteum; the gelatinous juice or callus, which should unite the fracture, being in so morbid a state as to produce a kind of caries with exostosis, instead of doing its proper duty, &c. Of all these there are examples, but they do not come within the plan which I prescribed to myself when I began these papers.

*** Mr. Pott might undoubtedly have been more diffuse, and have considerably dilated on his subject, if he had taken into consideration the various incidents which he has enumerated in the preceding note; and which are sometimes the consequences of fractured bones: but though (as he observes) this may not be deemed a professed regular treatise, he has certainly undervalued it, when he entitled it "A few general Remarks on Fractures and Dislocations," as the reader must have observed that it abounds in observations and rules of great consequence on this very important subject. And, indeed, it has been the principal cause of introducing a new mode of treating fractures, which is now almost universally approved and adopted. The idea of relaxing the muscles, in order more easily to set a broken or dislocated limb, is of infinite importance; and was certainly not sufficiently attended to before this treatise made its appearance.

If it were necessary to add any thing to the advantages which Mr. Pott has mentioned arising from the relaxed position in fractures, it might be observed, that in this situation patients very rarely suffer from cramps and spasms, which are frequently attendant when the limb is laid straight, and are extremely painful and productive of mischief; and I might add, that people, whose limbs have been fractured by a fall, a kick of a horse, or any other accident, are very subject to such agitation of mind that their sleep for many nights is unsound; they continually dream of what they have suffered, and they catch and spring with an imaginary attempt to save themselves. When the leg was laid in a line with the body, the jerk was infallibly communicated to the fractured part, which gave the patient excruciating pain, and destroyed his repose for the remainder of the night; and in the morning the tedious painful process of putting it to rights was necessarily renewed. The involuntary actions of coughing and sneezing had also the same mischievous effect; and whoever has seen fractured legs lying in the straight posture must be sensible that these circumstances have frequently occurred. In the relaxed position the shock is lost in the bended joints of the hip and knee, and the limb is not obliged to move with the body. Yet, although

I have reason to approve in general of Mr. Pott's plan, of placing fractured legs on the outside, on the fibula, we sometimes find cases which should form exceptions to this general rule, particularly in fractures of the leg, where the broken end of the superior part of the tibia projects forward. In that case we sometimes find it impracticable to keep the ends of the bone even, without placing it on the heel.

In compound fractures, also, we sometimes find great advantage in placing the leg on the calf and heel; for instance, where there is a deep wound leading down to the bone on the inside of the leg or ancle, if it lies on the outside it is evident that a cavity must be formed in which the matter will be retained; and which, being in continual contact with the bones, must create great mischief, as it can only be wiped away, and that very imperfectly, once or twice a day, when the wound is dressed. In this case, sometimes by placing the leg on the heel, an effectual current may be given to the matter, so soon as it is formed; the good effect of which on the wound will soon be perceived. In short, in all those cases where there are wounds, in which a depending opening can be effected by the position on the heel, it is to be preferred.

Except in such and similar cases to those just mentioned, I am a strong advocate for placing *broken legs* on the outside.

But I must confess that I have long entertained doubts whether this ought to be considered the best position for broken thighs. From the large mass of strong muscles surrounding the bone, from there being only one point of solid contact, and no other bone to assist in keeping it steady, the thigh-bone is the most difficult to be placed, and most easy to be displaced, of any in the human frame. From long experience, I am convinced that bending the thigh and laying it on the outside, will not insure a straight and even union; and I appeal to those who have seen many fractured thighs treated in this manner, if the broken ends of the bone do not frequently ride over each other, in consequence of which the broken thigh is often made shorter than the other, and the foot in walking turns outward. These defects, if they are not very wrong, become palliated, and less discernible, from the person being accustomed to meet them, by lowering, as he walks, the pelvis on the defective side. But the fact is as I have stated, and has often

raised in my mind great objections to placing fractured thighs on the outside. I conceive that the displacement of the bones in this case is often owing to the weight of the pelvis bearing down the superior part of the broken thigh into a depression in the bed; for if this should give way, and become hollow, the whole of the thigh, as far as the fractured part, will be carried down and sink into it, while the lower end of the bone and knee retaining the first position in which they were placed, an obtuse angle will be formed; as it is impossible to keep on bandages and splints so tight as to counteract a deviation from the right position, when effected by such powerful means. In this case, very able surgeons, to my knowledge, have been and may again be deceived; for if the bandage be undone, and the thigh viewed in this position, the outline of the upper part of the thigh down to the knee will be perfect, and it will appear straight: but there is often a protrusion of the upper end of the fracture internally, which is not visible, and which nothing but accurate examination with the fingers can, through that vast thickness of soft parts, discover. If it be not noticed in time, (that is, very early after the accident, perhaps within a week or ten days, according to the uniting disposition, which varies in different subjects and from different causes,) the discovery will be made too late; an adhesion will soon take place between the ends of the bones and the contiguous muscles; bony matter will soon be formed in the interspace; and it will not be in our power to remedy this effect: of course the leg and foot will in future turn outwards. These considerations have led me, contrary to my education, to prefer laying broken thighs in a line with the body, conceiving that in this situation the fracture is less liable to be displaced, and that any deviation from the straight line, whether above or below, or on either side, is more readily discernible and more easily rectified. I do not wish to insinuate that placing fractured thighs in the straight position is a new idea. I know it has been, and is now, practised by many—I only mean to say, that, though I have long been accustomed to see them laid in a bent posture, for the reasons above given I prefer the other: at the same time, in case of laying fractures either of the leg or thigh in a straight position, we need not lose sight of Mr. Pott's first and great principle, the benefit and use of relaxing the mus-

cles; and by raising the thigh toward the body, supporting that with pillows, and bending the knee to a certain degree, the same end may be obtained.

There is one case where we can have no choice—I mean when both thighs are broken. Under these circumstances it is evident that the patient must lie on his back, and consequently the thighs must be in a straight position: when thus of necessity placed, they do well; and this is a strong argument in favour of the practice.

But if there be any doubt of superiority between the straight and bent position of fractured thighs, there is a new contrivance which I conceive must turn the scale in favour of the former, as in that posture, the introduction of any kind of machine under the patient to relieve him from natural evacuations, and the efforts to raise and assist himself, which from an innate sense of cleanliness he would otherwise almost involuntarily make, are by that invention wholly avoided; and I am sure every gentleman of the faculty will agree with me, that those circumstances are very often the cause of disturbing and displacing fractured thigh-bones, in whatever situation they may be placed.

The contrivance consists in a double bed: the upper one has an opening in the sacking, in a suitable place, and of a proper size, to which a thin mattress, blanket, and sheet, are made to correspond, with a similar aperture: this, by a very simple piece of mechanism, may be elevated to a sufficient height for the nurse to introduce a proper receptacle between that and the fixed bed. The patient being relieved, the bed is gently let down again upon the under one, a thin cushion being placed on the under bed, to fill up the opening and make the upper bed level.

Such a machine has been long and much wanted on many occasions. Indeed it is surprising, that among so many inventions to promote gratification and convenience, so little has been done for the accommodation of the bed-ridden, or persons who are unable, from various causes, to leave their beds. These unfortunate beings, in this age of ingenuity and science, are still left in the same state that they have been obliged to submit to for centuries past.

It is well known that the common method of refreshing beds under sick persons is by removing the patient to one side of the bed, while the other side is shaken up; after which he is again

removed till the opposite side is made. This must be allowed to be only a sort of half-comfort; the bed can be but imperfectly made, and can have no opportunity of becoming cool; consequently the patient is again consigned to the annoyance of his own heat and perspiration; and in fractures, rheumatism, gout, and many other cases which might be mentioned, even this refreshment it is sometimes impossible to give. By this contrivance, the upper bed may be raised, and the under one completely made, as often as may be thought necessary or agreeable, without disturbing or discomposing the patient.

If it be objected, that though the under bed may be made, the upper one cannot be changed, it may be answered, that the under one is of the most consequence, being the same feather-bed or mattresses the person is accustomed to lie on, while the upper one has only a thin mattress, blanket, and sheet; but by means of a bar which was added for this and other purposes, it will be found that the upper bed may also at any time be occasionally changed.

After many years experience of the distressful situation of persons who from various complaints could not be removed from their loathsome beds, but have been obliged to remain in them till the very bed and sacking have rotted under them—after having so often witnessed the difficulty, danger, and not unfrequently the injury, which is caused by forcing a bed-pan under a patient in cases of fractures, painful wounds, rheumatic or gouty affections, and many other instances which might be mentioned—after having seen many cases in which it was absolutely impossible to introduce it at all, or its more filthy substitute (a draw-sheet), when the nurse could use no other than the most disgusting and imperfect means of cleaning the patient—it cannot be wondered at if I feel great pleasure in communicating a contrivance, which will gently raise the patient, permit the bed to be fresh made, and give him the exquisite delight of coolness and cleanliness.

It is then my opinion, that not only in fractures and dislocations of the lower limbs, both simple and compound, but in diseases of the knee, hip, and spine; in fevers, when from long continued and unvaried position, added to moisture and heat, excoriations and often extensive mortifications take place on the nates, hips, and lower part of the back; in fistulas in perineo; in the gout and

rheumatism, in which the least motion is often torture; in the natural confluent small-pox; in child-bearing, particularly in those cases where puerperal inflammation or danger of flooding requires a strict horizontal posture; in cases of insanity, when coercion is necessary; in sickness, weakness from age, or any other infirmity, which prevents persons from leaving their beds, or from moving or being moved in them, the double bed will be found of admirable use and assistance.

It was invented by Mr. Henry Earle at a very early age, and soon after the commencement of his professional studies. Independent of any partiality, which on that score I might conceive for the invention, it appeared to me, and indeed is allowed by every one who has seen it, so well calculated to be useful on a great variety of occasions, that I have been induced to treat on it more at large in a Letter; from which this is an extract, and in which its many comforts and utilities are pointed out.

Representations of the bed will also there be found; and conceiving they would not be unacceptable or unuseful, I have inserted them in this work. E.

* Containing some 'Observations on Fractures of the Lower Limbs. To which is added, an Account of a Contrivance to administer Cleanliness and Comfort to the Bed-ridden, or Persons confined to Bed by Age, Accidents, Sickness, or any other Infirmity. With Explanatory Plates. E.

PLATE I.

Represents the original bed at St. Bartholomew's hospital, 3 feet 6 inches wide by 6 feet 4 inches in length. This being made expressly for the purpose, the upper bed corresponds exactly, and fits in with the other; but being intended for public and constant use, it is heavier and stronger than is necessary for private families.

Fig. 1, shows the upper bed lying on the under one.

Fig. 2, the upper bed raised to a convenient height.

PLATE II.

Shows the improved plan, in which the upper bed is made of sufficient width for one person, but it is intended to be placed on and fixed to any bed of any breadth.

The upper bed is seen lying on the lower bed,—and also as it appears when raised up.

Specimens of the bed may be seen at Mr. Oakley's, No. 8, Old Bond Street, who has undertaken the manufacture of them.

PLATE 1

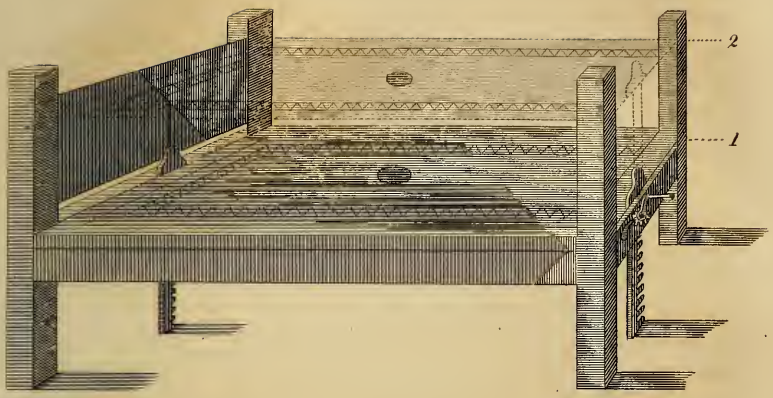
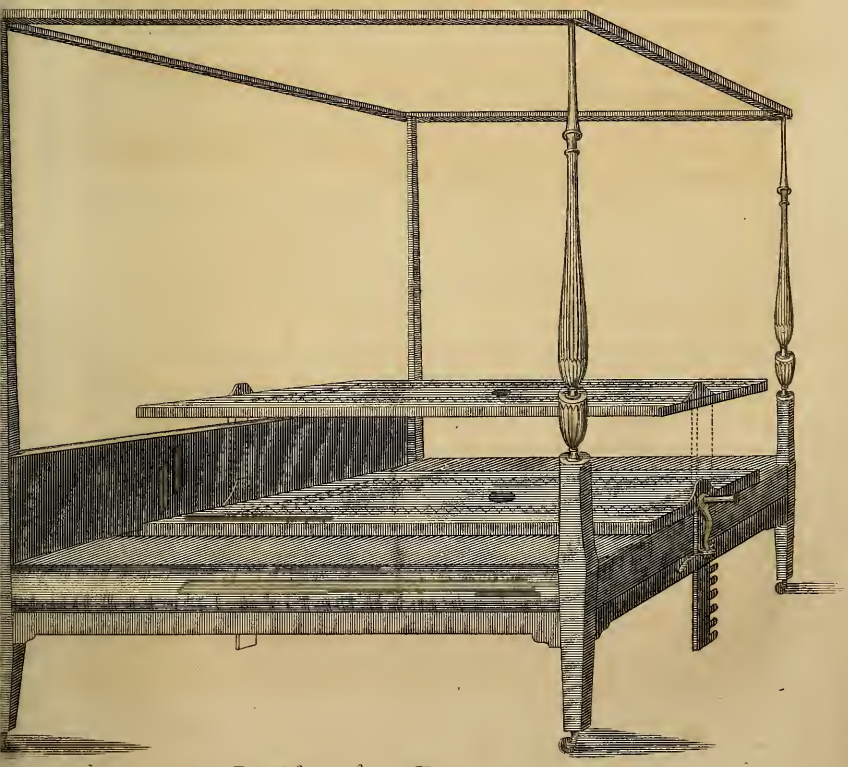


PLATE 2



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COMPOUND FRACTURES.

I USE the term compound fracture in the sense in which the English have always used it; that is, to imply a broken bone complicated with a wound.

In this kind of case the first object of consideration is, whether the preservation of the fractured limb can, with safety to the patient's life, be attempted; or, in other words, whether the probable chance of destruction, from the nature and circumstances of the accident, is not greater than it would be from the operation of amputation. Many things may occur to make this the case. The bone or bones being broken into many different pieces, and that for a considerable extent, as happens from broad wheels, or other heavy bodies of large surface, passing over, or falling on such limbs; the skin, muscles, tendons, &c. being so torn, lacerated, and destroyed, as to render gangrene and mortification the most probable and most immediate consequence; the extremities of the bones forming a joint being crushed, or as it were comminuted; and the ligaments connecting such bones being torn and spoiled; are, among others, sufficient reasons for proposing and for performing immediate amputation—reasons, which (notwithstanding any thing that may have been said to the contrary) long and reiterated experience has approved, and which are vindicable upon every principle of humanity or chirurgic knowledge.

When a surgeon says, that a limb, which has just suffered a particular kind of compound fracture, ought rather to be immediately cut off, than that any attempt should be made for its preservation, he does not mean, by so saying, that it is absolutely impossible for such limb to be preserved at all events; he is not to be supposed to mean so much in general, though sometimes even that will be obvious; all that he can truly and justly mean is, that from the experience of all time it has been found, that the attempts to preserve limbs so circumstanced, have most frequently been frustrated by the death of the patients, in consequence of such injury; and that from the same experience it has been found, that

the chance of death from amputation is by no means equal to that arising from such kind of fracture.

Every man knows, that apparently desperate cases are sometimes cured; and that limbs so shattered and wounded, as to render amputation the only *probable* means for the preservation of life, are now and then saved. This is an uncontroverted fact, but a fact which proves very little against the common opinion; because every man of experience also knows, that such escapes are very rare, much too rare to admit of being made precedents, and that the majority of such attempts fail.[y]

This consideration relative to amputation is of the more importance, because it most frequently requires immediate determination; every minute of delay is, in many instances, to the patient's disadvantage; and a very short space of time indeed frequently makes all the difference between probable safety and fatality. If these cases in general would admit of deliberation for two or three days, and during that time such circumstances might be expected to arise, as ought necessarily to determine the surgeon in his conduct without adding to the patient's hazard, the difference would be considerable; the former would not seem to be so precipitate in his determination, as he is frequently thought to be; and the

y The baron Van Swieten, writing, as many others have done, that is, theoretically, on surgery, advises us, in the case of very bad compound fractures, which may most probably require amputation, to defer the operation, until we have tried the force of antiseptic fomentation and applications of like kind for two or three days; and this opinion and advice he builds, in some meaaure, on a remarkable success of La Motte, in a seemingly desperate case, of a man's leg mashed by the wheel of a heavy carriage.

That De La Motte's patient escaped, I make no doubt, because he has said so; but the surgeon showed much more rashness in attempting to save such a limb, than he would have done in the amputation of it: the operation would have been the more justifiable practice. With regard to the baron's advice, to stay two or three days, I take the liberty to add, that if you do that, stay several more; for at the end of that time (I mean two or three days) the patient will have very little chance indeed from the operation, much less than he would have had at the time of the accident.

I should be very sorry to be thought a patron or an adviser of rashness or cruelty; but in what I have here said, I believe I shall have every man in the profession, who has either true humanity or sound judgment, founded on experience, on my side.

latter, being more convinced of the necessity, would submit to it with less reluctance. But unhappily for both parties, this is seldom the case; and the first opportunity having been neglected or not embraced, we are very frequently denied another. Here therefore the whole exertion of a man's judgment is required, that he may neither rashly and unnecessarily deprive his patient of a limb, nor, through a false tenderness and timidity, suffer him to perish by endeavouring to preserve such limb. Some degree of address is also necessary upon such occasion, in order to convince the patient, that what seems to be determined upon hastily and with precipitation, will not safely admit of longer deliberation.[z]

The limb being thought capable of preservation, the next consideration is the reduction of the fracture. The ease or difficulty

[z] That there are many cases which, from the extent of the laceration or from hæmorrhage, particularly in the leg, where the interosseal artery is torn by the ragged ends of the bones, and from other circumstances, it may be necessary to proceed to immediate amputation, must be allowed. But except in cases of extreme necessity, I must say, that sometimes, where the appearances scarcely furnish the glimmering of a hope of ultimately saving the limb, if the person appeared of a robust over-full habit, I should be inclined to wait, and to put off the operation until inflammation had taken place, and had subsided, and the patient had changed the high and boisterous state of health which he enjoyed at the time of meeting with the accident, for a quieter or more temperate circulation, when I conceive he would stand a better chance of recovering from the operation. I will here quote two similar accidents which terminated very differently:—

A stout lusty man, of a full habit of body, was employed at the European Museum to hang some pictures. When on the ladder, he fell down with a heavy picture in his hands, by which his right foot and ancle were crushed, and dreadfully mangled. Though there was very little probability of the limb being saved, it was judged right to attempt it. I did not see him at first, but afterwards in consultation, when it appeared to me impossible to preserve the limb; but as his habit was apparently gross and full, it was agreed to wait some time longer. The quantity of discharge, low diet, and proper medicines lowered his constitution to a pitch much inferior to high health. He was now evidently losing ground; and as there remained not the most distant prospect of preserving the limb, it was amputated. Without any adverse circumstances, he got well, and remains a healthy man.

A gentleman, getting up on a library-ladder, fell down, and received a very bad compound fracture of the leg: it was judged, in consultation, impossible to save the limb, and immediate amputation took place. Inflammatory symptoms succeeded so high as to cause his death. E.

attending this depends not only on the general nature of the case, but on the particular disposition of the bone with regard to the wound.

If the bone be not protruded forth, the trouble of reducing, and of placing the fracture in a good position, will be much less than if the case be otherwise; and in the case of protrusion or thrusting forth of the bone or bones, the difficulty is always in proportion to the comparative size of the wound, through which such bone has passed. In a compound fracture of the leg or thigh, it is always the upper part of the broken bone which is thrust forth. If the fracture be of the transverse kind, and the wound large, a moderate degree of extension will in general easily reduce it; but if the fracture be oblique, and terminates, as it often does, in a long sharp point, this point very often makes its way through a wound no larger than just to permit such extension. In this the very placing the leg in a straight position, in order to make extension, obliges the wound or orifice to gird the bone tight, and makes all that part of it, which is out of such wound, press hard on the skin of the leg underneath it. In these circumstances, all attempts for reduction in this manner will be found to be impracticable; the more the leg is stretched out, the tighter the bone will be begirt by the wound, and the more it will press on the skin underneath.

Upon this occasion, it is not very unusual to have recourse to the saw, and by that means to remove a portion of the protruded bone.

I will not say that this is always or absolutely unnecessary or wrong, but it most certainly is frequently so. In some few instances, and in the case of extreme sharp-pointedness of the extremity of the bone, it may be, and undoubtedly is right: but in many instances, it is totally unnecessary.

The two most proper means of overcoming this difficulty are, change of posture of the limb, and enlargement of the wound. In many cases the former of these, under proper conduct, will be found fully sufficient; and where it fails, the latter should always be made use of. Whoever will attend to the effect, which putting the leg or thigh (having a compound fracture and protruded bone) into a straight position always produces; that is, to the manner in which the wound in such position girds the bone, and to the

increased difficulty of reduction thereby induced, and will then, by changing the posture of such limb from an extended one, to one moderately bent, observe the alteration thereby made, in both the just mentioned circumstances, will be satisfied of the truth of what I have said, and of the much greater degree of ease and practicability of reduction in the bent, than in the extended position; that is, in the relaxed, than in the stretched state of the muscles. Reduction being found impracticable, either by extension or change of posture, the obvious and necessary remedy for this difficulty is enlargement of the wound. This to some practitioners, who have not seen much of this business, appears a disagreeable circumstance, and therefore they endeavour to avoid it; but their apprehensions are in general groundless and ill-founded. In enlarging the wound there is neither difficulty nor danger; it is the skin only which can require division; and in making such wound there can be no possible hazard. It is needless to say that the division should be such as to render reduction easy; or to remind the practitioner, that such enlarged opening may serve very good future purposes, by making way for the extraction of fragments, and the discharge of matter, sloughs, &c.

If the bone be broken into several pieces, and any of them be either totally separated, so as to lie loose in the wound, or if they be so loosened and detached as to render their union highly improbable, all such pieces ought to be taken away; but they should be removed with all possible gentleness, without pain, violence, or laceration, without the risk of hæmorrhage, and with as little poking into the wound as possible. If the extremities of the bone be broken into sharp points, which points wound and irritate the surrounding parts, they must be removed also. But the whole of this part of the treatment of a compound fracture should be executed with great caution; and the practitioner should remember, that if the parts surrounding the fracture be violated, that is, be torn, irritated, and so disturbed as to excite great pain, high inflammation, &c. it is exactly the same thing to the patient, and to the event of the case, whether such violence be the necessary consequence of the fracture, or if his unnecessary and awkward manner of poking into, and disturbing the wound. The great objects of fear and apprehension in a compound fracture (that is, in the

first or early state of it) are, pain, irritation, and inflammation; these are to be avoided, prevented, and appeased by all possible means, let every thing else be as it may; and although certain things are always recited, as necessary to be done, such as removal of fragments of bone, of foreign bodies, &c. &c. &c. yet it is always to be understood, that such acts may be performed without prejudicial or great violence, and without adding at all to the risk or hazard necessarily incurred by the disease.

Reduction of or setting a compound fracture is the same as in the simple; that is, the intention in both is the same, *viz.* by means of a proper degree of extension to obtain as apt a position of the ends of the fracture with regard to each other, as the nature of the case will admit, and thereby to produce as perfect and as speedy union as possible.

To repeat in this place what has already been said under the head of extension, would be tedious and unnecessary. If the arguments there used for making extension, with the limb so moderately bent as to relax the muscles, and take off their power of resistance, have any force at all, they must have much more when applied to the present case: if it be allowed to be found very painful to extend, or to put, or keep on the stretch, muscles which are not at all or but slightly wounded, and only liable in such extension to be pricked and irritated, it is self-evident that it must be much more so when the same parts are torn and wounded considerably; when the ends of the fractured bone have made their way quite through them, divided the skin, and laid all open to the access of the air.

Every consequence which does or may be supposed to flow from wound, pain or irritation, in consequence of violence, must necessarily be much greater, when a lacerated wound, and that made by the bone, is added to the fracture; not to mention the ills arising from extending or stretching out muscles already torn or half divided.

One moment's reflexion must be sufficient to convince any reasonable man: but experience is the only proper test of all these kinds of things. Let this method of treatment then be fairly and properly subjected to it; and if the great advantage of the one over the other does not appear, that is, if the less sensation of pain by

the patient, and the more happy, more perfect, and more expeditious accomplishment of his purpose by the surgeon, do not determine greatly in favour of relaxed position, I am, and have, for a considerable length of time, been greatly mistaken.

The wound dilated, (if necessary,) loose pieces removed, (if there were any,) and the fracture reduced, and placed in the best possible position, the next thing to be done is to apply a dressing.

On this subject a great deal has been said by writers, particularly by such of them as have implicit faith in external applications; but, in order to be able to execute this part of the process properly, a man has only to ask himself, What are the intentions which, by any kind of dressing to a compound fracture, he means to aim at the accomplishment of? And a rational answer to this will give him all that he can want to know.

The dressing necessary in a compound fracture is of two kinds; *viz.* that for the wound, and that for the limb. By the former, we mean to maintain a proper opening for the easy and free discharge of gleet, sloughs, matter, extraneous bodies, or fragments of bone, and this in such manner, and by such means, as shall give the least possible pain or fatigue, shall neither irritate by its qualities, nor oppress by its quantity, nor by any means contribute to the detention or lodgement of what ought to be discharged. By the latter, our aim should be the prevention or removal of inflammation, in order, if the habit be good, and all other circumstances fortunate, that the wound may be healed, by what the surgeons call the first intention, that is, without suppuration or abscess; or that not being practicable, that gangrene and mortification, or even very large suppuration may be prevented, and such a moderate and kindly degree of it established as may best serve the purpose of a cure. The first therefore, or the dressing for the wound, can consist of nothing better, or indeed so good, as soft dry lint, laid on so lightly as just to absorb the sanies, but neither to distend the wound, nor be the smallest impediment or obstruction to the discharge of matter. This lint should be kept clear of the edges, and the whole of it should be covered with a pledget spread with a soft easy digestive. The times of dressing must be determined by the nature of the case: if the discharge be small or moderate, once in twenty-four hours will be sufficient; but if it be

large, more frequent dressing will be necessary, as well to prevent offence, as to remedy the inconveniences arising from a great discharge of an irritating sharp sanies.

The method of treating the limb, with a view to the prevention of such accidents and symptoms, as pain, inflammation, and laceration of parts, are likely to produce, is different with different practitioners; some using, from the very first, relaxing, greasy applications; others applying medicines of very different nature. Both these may be right conditionally, that is, according to different circumstances in the cases, but they cannot be equally so in the same circumstances.

Many practitioners are accustomed to envelope compound fractures in a soft, warm, relaxing cataplasm from the very first; whether the limb be in a tense swollen state, or not. This, if I may take the liberty of saying so, appears to me to be injudicious. When from neglect, from length of time passed without assistance, from misconduct or drunkenness in the patient, from awkwardness and unhandiness in the assistants, or from any other cause, a tension has taken possession of the limb, and it is become tumid, swollen, and painful, a warm cataplasm is certainly the best and most proper application that can be made, and that for very obvious reasons: the state of the parts under these circumstances is such, that immediate union is impossible, and nothing but a free and plentiful suppuration can dissipate or remove impending mischief: every thing therefore which can tend toward relaxing the tense, swollen, and irritable state of the parts concerned, must necessarily be right; the one thing aimed at (plentiful suppuration) cannot be accomplished without it. But when the parts are not in this state, the intention seems to be very different. To relax swollen parts, and to appease pain and irritation by such relaxation, is one thing; to prevent inflammatory defluxion and tumefaction is certainly another; and they ought to be aimed at by very different means. In the former a large suppuration is a necessary circumstance of relief, and the great means of cure; in the latter it is not, and a very moderate degree of it is all that is required. The warm cataplasm, therefore, although it be the best application that can be made use of in the one case, is

certainly not so proper in the other, as applications of a more discutient kind, such as mixtures of spirit. vini., vinegar and water, with crude sal ammoniac, spirit. mindereri, acet. litharg., and medicines of this class, in whatever form the surgeon may choose. By these, in good habits, in fortunately circumstanced cases, and with the assistance of what should never be neglected, I mean phlebotomy, and the general antiphlogistic regimen, inflammation may sometimes be kept off, and a cure accomplished, without large collections or discharges of matter, or that considerable degree of suppuration, which, though necessary in some cases, and almost unavoidable in others, are and must be rather promoted and encouraged than retarded or prevented, by warm relaxing applications of the poultice kind.[a]

[a] The principal cause of the inflammation, and the consequent bad symptoms which so frequently take place in compound fractures, appears to arise from the admission of air into the wound among the fractured bones; for we see that bones may be broken, ligaments and tendons may be bruised, torn, and wounded in any manner, and will unite, heal, and do well again, like other soft parts, provided no air gains admission: but if that is suffered to enter, it too often lights a fire which the art of surgery cannot quench. The stimulating influence of air on diseased cavities, is evident on many occasions. In the psoas abscess, matter may be formed and increased, so as to make a swelling of great magnitude; the patient will notwithstanding continue free from fever: but from the moment it is opened, and air admitted, a hectic fever takes place. Large extravasations of blood will remain in a quiet state for any length of time till they are re-absorbed, provided the skin remains whole; but if an opening is made, and air permitted to enter, a stimulus is applied, inflammation is excited, and a putrid slough of the sides of the cavity and its contents will generally be the consequence. Many other instances might be adduced, to prove that air, from whatever principle it acts, is certainly the great enemy in all these cases. Our first aim should therefore be to prevent it from entering, or, if it has entered, to exclude it; and this may frequently be accomplished by closing the wound as soon as possible, after the bones are placed in their proper situation, and by keeping it close with slips of sticking plaster; or in some cases sutures may be employed with advantage: it should then be covered with proper dressings, such as dry lint and sedative applications, avoiding every thing greasy. These first dressings should not be removed for many days, unless a collection of matter makes it necessary to change them. By these means the wounds in the soft parts may often be brought to heal by the first intention; and thus compound fractures, unattended with the usual long train of evils which Mr. Pott has so well described, will frequently unite, and give no more trouble than simple fractures. The fortunate termination of the compound fracture in his own leg, was proba-

Compound fractures in general require to be dressed every day; and the wounded parts not admitting the smallest degree of motion without great pain, perfect quietude becomes as necessary as frequent dressing.

bly owing to the air being excluded: but this arose from the nature of the fracture, rather than from the manner in which it was treated, as the idea of preventing the first admission of air, in these cases, was not at that time attended to; though, while they were changing their dressings, by means of lamps and other contrivances, our forefathers endeavoured to correct its pernicious effects, which they ascribed to cold. In Mr. Pott's case, the fact was, that the bone had made its way through the skin at a distance from the fracture; so that, when it was returned into its place, the soft parts closed, and prevented the air from getting in; by which means the wound healed by the first intention. I have now under my care a man who had a compound fracture of the leg. The wound was small, easily closed, and kept so by sticking plaster: as no bad symptoms followed, the first dressings were suffered to remain a fortnight, at the end of which time the wound was found healed, and the bones firm. Had it not been thus treated—on the contrary, had the dressings been removed, and the air suffered to enter—it is more than probable that the usual bad symptoms would have arisen; for the danger in compound fractures does not depend on the size of the wound. If air gets in, a small wound is equally bad as a large one, perhaps worse, by confining the matter after it is collected. I have mentioned this case as it occurs on the instant; but could adduce many more, in which equal success has attended this mode of practice.

The benefit arising from keeping out air, in these cases, was an observation I made when very young in the profession; and practice and experience have convinced me of the truth of it. I was sent for, many years ago, to a person who by a fall had a compound dislocation of the joint of the ancle. The skin was torn evenly, as if it had been divided with a knife: I could pass my finger into the cavity of the joint. Being aware of the horrid mischief which is usually produced by air being admitted into these cavities, I was induced to try what would be the consequences of its entire exclusion: accordingly I sewed up the wound close, with a number of fine stitches, merely passing them through the edges of the skin, and then applied proper dressing and bandage. The wound, to my great surprise, healed by the first intention, without more inflammation than usually attends wounds of any other part. It may be proper to remark, that at the same time the man had received so violent a contusion on his back as to render his lower limbs paralytic. How far the want of nervous influence might have been the cause of the small degree of inflammation which took place, I cannot determine. It is a case which will not be easily paralleled, and no one can suppose that I mean to say that this plan will always succeed in compound fractures. However, the attempt is worth making in most cases, as no detriment can arise from it; and if we gain our point, it is a most important one to the patient, who avoids a tedious

The common bandage therefore (the roller) has always in this case been laid aside, and what is called the eighteen-tailed bandage substituted, very judiciously, in its place. Of this I have already spoken so largely, as to make repetition unnecessary.

Splints, that is, such short ones as are most commonly made use of in simple fractures, are by all forbid in the compound, and that for the same reason which ought to have prevented them from having ever been used in the former; *viz.* because the probable good to be derived from them can be but little; and the probable mischief is obvious and considerable.

But although short splints are for many reasons palpably improper, in both cases, yet those of proper length, those which reach from joint to joint, comprehend them both, and are applied on each side of the leg only, are very useful both in the simple and in the compound fracture; as they may, thus applied, be made to keep the limb more constantly steady and quiet, than it can be kept without them.

With regard to position of the limb, I have already been so explicit, when speaking of the simple fracture, that to say any thing more about it here would be an abuse of the reader's time and patience. The only, or the material difference between a simple and a compound fracture, as far as relates to this part of the treatment, is, that as the parts surrounding the broken bone in the latter are more injured, and consequently more liable to irritation, pain, inflammation, and all their consequences, therefore every method and means, by which the alleviation of such symptoms, and the prevention of such consequences can be obtained, is still more necessary and requisite. Among these the posture of the limb is so principal a circumstance, that without its concurrence every other will be fruitless. The points to be aimed at are, the even position of the broken parts of the bone, and such disposition of the muscles surrounding them, as is most suitable to their wounded, lacerated state, as shall be least likely

confinement of perhaps many months, not to mention all the concomitant evils. During this healing process we should endeavour to prevent inflammation from taking place by sedative applications, of which the saturnine are most efficacious; and by every means, both internal and external, which experience suggests. E.

to irritate them, by keeping them on the stretch, or to produce high inflammation, and at best large suppuration. These, I say, are the ends to be pursued; and how much the position of the limb does, and must necessarily contribute to the advantage or disadvantage just recited, must be so obvious to any body capable of reflexion, that nothing more need be said about it.

At the beginning of these sheets, I have said, that it was not my intention to write a regular treatise, but only to throw out a few hints which I hoped might prove useful to such as have not yet received better information. The part of my subject at which I am now arrived, does not indeed admit of much more: a few general precepts are all which a writer can give: the particular method of conducting each particular case must be determined by the nature of that case, and by the judgment of the surgeon.

Every body knows, or ought to know, that these cases of all others require at first the most rigid observance of the antiphlogistic regimen; that pain is to be appeased, and rest obtained, by anodynes; that inflammation is to be prevented or removed by free and frequent bleeding, by keeping the body open, and by the administration of such medicines as are best known to serve such purposes; and that, during this first state or stage, the treatment of the limb must be calculated, either for the prevention of inflammatory tumefaction, by such applications as are in general known by the title of discutients; or, such tumor and tension having already taken possession of the limb, that warm fomentation and relaxing and emollient medicines are required.

If these, according to the particular exigence of the case, prove successful, the consequence is, either a quiet easy wound, which suppurates very moderately, and gives little or no trouble; or a wound, attended at first with considerable inflammation, and that producing large suppuration, with great discharge and troublesome formation and lodgement of matter. If, on the other hand, our attempts do not succeed, the consequence is gangrene and mortification.

These are three general events or terminations of a compound fracture, and according to these must the surgeon's conduct be regulated.

In the first instance, he has indeed nothing to do but to avoid doing mischief, either by his manner of dressing, or by disturbing the limb. Nature let alone will accomplish her own purpose; and art has little more to do than to preserve the due position of the limb, and to take care that the dressing applied to the wound proves no impediment.

In the second stage, that of formation and lodgement of matter, in consequence of large suppuration, all a surgeon's judgment will sometimes be required in the treatment both of the patient and his injured limb. Enlargement of the present wound, for the more convenient discharge of matter;[b] new or counter openings for the same purpose, or for the extraction of fragments of broken or exfoliated bone, will very frequently be found necessary, and must be executed. In the doing this, care must be taken that what is requisite be done, and no more; and that such requisite operations be performed with as little disturbance and pain as possible: the manner of doing business of this kind, will make a very material difference in the sufferings of the patient.

Very contrary, or at least very different intentions, seem to me to require the surgeon's very particular attention in the two parts of this stage of the disease.

Previous to large suppuration, or considerable collections and lodgements of matter, tumefaction, induration, and high inflammation, attended with pain, irritation, and fever, require evacuation by phlebotomy, an open belly, and antiphlogistic remedies, as well as the free use of anodynes, and such applications to the limb as may most serve the purpose of relaxation. But the matter having been formed and let out, and the pain, fever, &c., which were symptomatic thereof, having disappeared or ceased, the use and purpose of such medicines and such applications cease also,

[b] It is a practice with some, from a timidity in using a knife, to make use of bolsters and plaster-compresses for the discharge of lodging matter. Where another or a counter opening can conveniently and safely be made, it is always preferable, the compress sometimes acting diametrically opposite to the intention with which it is applied, and contributing to the lodgement by confining the matter; beside which, it requires a greater degree of pressure to make it efficacious, than a limb in such circumstances generally can bear.

and they ought therefore to be discontinued. By evacuation, &c., the patient's strength has necessarily (and indeed properly) been reduced: by cataplasm, &c., the parts have been so relaxed as to procure an abatement or cessation of inflammation, a subsidence of tumefaction, and the establishment of a free suppuration; but, these ends once fairly and fully answered, another intention arises, which regards the safety and well-doing of the patient, nearly, if not full as much as the former; which intention will be necessarily frustrated by pursuing the method hitherto followed. The patient now will require refection and support, as much as he before stood in need of reduction; and the limb, whose indurated and inflamed state hitherto required the emollient and relaxing poultice, will now be hurt by such kind of application, and stand in need of such as are endued with contrary qualities, or at least such as shall not continue to relax. Good, light, easily digested nutriment, and the Peruvian bark, will best answer the purpose of internals: the discontinuation of the cataplasms, and the application of medicines of the corroborating kind, are as necessary with regard to externals.[c]

In short, if there be any rationale in the use of the cataplasm in the first stage, its impropriety in the second must be evident from the same principles. So also with regard to evacuation, and the antiphlogistic regimen, when all the good proposed to be obtained by them has been received, a pursuit of the same method must become injurious, and that for the same reason which before rendered it necessary and beneficial.

A non-attention to this has, I believe, been not infrequently the cause of the loss both of limbs and lives.

Every body who is acquainted with surgery knows, that in the case of bad compound fracture, attended with large suppuration, it sometimes happens, even under the best and most judicious

[c] It is surprising how large and how disagreeable a discharge will be made for a considerable length of time, in some instances, from the detention and irritation of a splinter of bone. If therefore such discharge be made, and there be neither sinus nor lodgement to account for it, and all other circumstances are favourable, examination should always be made, in order to know whether such cause does not exist; and if it does, it must be gently and carefully removed.

treatment, that the discharge becomes too great for the patient to sustain; and that, after all the fatigue, pain, and discipline, which he has undergone, it becomes necessary to compound for life by the loss of the limb.[d] This, I say, does sometimes happen under the best and most rational treatment; but I am convinced that it also is now and then the consequence of pursuing the reducing, the antiphlogistic, and the relaxing plan too far. I would therefore take the liberty seriously to advise the young practitioner, to attend diligently to his patient's pulse and general state, as well as to that of his fractured limb and wound; and when he finds all febrile complaint at an end, and all inflammatory tumor and hardness gone, that his patient is rather languid than feverish, that his pulse is rather weak and low than hard and full, that his appetite begins to fail, and that he is inclined to sweat or purge without assignable cause, and this in consequence of a large discharge of matter from a limb which has suffered great inflammation, but which is now become rather soft and flabby than hard and tumid; that he will in such circumstances set about the support of his patient, and the strengthening of the diseased limb, *totis viribus;* in which I am from experience satisfied, he may often be successful where it may not be generally expected that he would. At least he will have the satisfaction of having made a rational attempt; and if he be obliged at last to have recourse to amputation, he will perform it, and his patient will submit to it, with less reluctance than if no such trial had been made.

I have said that a compound fracture either unites and heals as it were by the first intention, which is the case of some few, (and was my own,) or it is attended with high inflammation, multiplied abscesses, and large suppuration, demanding all the surgeon's attention and skill, and even then sometimes ending in the loss of limb, or life, or both; or, that all our attempts prove fruitless from

[d] There is one circumstance relative to compound fractures which perhaps may be deemed worth noting; which is, that I do not remember ever to have seen it necessary to amputate a limb for a compound fracture, on account of the too great discharge, in which the fracture had been united. In all those cases, where the operation has been found necessary on account of the drain, the fracture has always been perfectly loose and disunited.

the first, and gangrene and mortification are the inevitable consequence of the accident.

The two first I have already spoken to—the last only remains.

Gangrene and mortification are sometimes the inevitable consequences of the mischief done to the limb at the time that the bone is broken; or they are the consequences of the laceration of parts made by the mere protrusion of the said bone.

They are also sometimes the effect of improper or negligent treatment; of great violence used in making extension; of irritation of the wounded parts, by poking after, or in removing fragments or splinters of bone; of painful dressings; of improper disposition of the limb, and of the neglect of phlebotomy, anodynes, evacuation, &c. Any, or all these, are capable either of inducing such a state of inflammation as shall end in a gangrene, or of permitting the inflammation, necessarily attendant upon such accident, to terminate in the same event.

When such accident or such disease is the mere consequence of the injury done to the limb, or produced by it at the time of fracture, it generally makes its appearance very early; in which case, also, its progress is generally too rapid for art to check. For these reasons, when the mischief seems to be of such nature as that gangrene and mortification are most likely to ensue, no time can be spared; and the impending mischief must either be submitted to, or prevented by early amputation. I have already said, that a very few hours make all the difference between probable safety and destruction. If we wait till the disease has taken possession of the limb, even in the smallest degree, the operation will serve no purpose, but that of accelerating the patient's death. If we wait for an apparent alteration in the part, we shall have waited until all opportunity of being really serviceable is past. The disease takes possession of the cellular membrane surrounding the large blood-vessels and nerves, some time before it makes any appearance in the integuments; and will always be found to extend much higher in the former part, than its appearance in the latter seems to indicate. I have more than once seen the experiment made of amputating, after a gangrene has been begun, but I never saw it succeed: it has always hastened the patient's dissolution.

As far therefore as my experience will enable me to judge, or

as I may from thence be permitted to dictate, I would advise that such attempt should never be made: but the first opportunity having been neglected or not embraced, all the power of the chirurgic art is to be employed in assisting nature to separate the diseased part from the sound; an attempt which now and then, under particular circumstances, has proved successful, but which is so rarely so, as not to be much depended upon.

If the parts are so bruised and torn, that the circulation through them is rendered impracticable, or if the gangrene be the immediate effect of such mischief, the consequence of omitting amputation, and of attempting to save the limb, is, as I have already observed, most frequently very early destruction: but if the gangrenous mischief be not merely and immediately the effect of the wounded state of the parts, but of high inflammation, badness of general habit, improper disposition of the limb, &c., it is sometimes in our power so to alleviate, correct, and alter these causes, as to obtain a truce with the disease, and a separation of the unsound parts from the sound. The means whereby to accomplish this end, must, in the nature of things, be varied according to the producing causes or circumstances: the sanguine and bilious must be lowered and emptied; the weak and debilitated must be assisted by such medicines as will add force to the *vis vitæ;* and errors in the treatment of the wound or fracture must be corrected: but it is evident to common sense, that for these there is no possibility of prescribing any other than very general rules indeed. The nature and circumstances of each individual case must determine the practitioner's conduct.

In general, inflammation will require phlebotomy and an open belly, together with the neutral antiphlogistic medicines; pain and irritation will stand in need of anodynes and the Peruvian bark, joined in some cases and at some times with those of the cooling kind, at others with the cordial, will be found necessary and useful. So also tension and induration will point out the use of fomentation and warm relaxing cataplasms, and the most soft and lenient treatment and dressing. But there are two parts of the treatment of this kind of case mentioned by the generality of writers, which I cannot regard in the same point of view with them. One is, the the use of stimulating antiseptic applications to the wound; the

other is, what is commonly called scarification of the limb. [Let it be remarked that I speak of both these, as prescribed and practised while the gangrene is forming, as it were, and the parts are by no means mortified.] While the inflammatory tension subsists, alleviation of pain, and relaxation of the wound and swollen parts, in order to obtain a suppuration, and consequently a separation, seem to constitute the intention, which ought to be pursued upon the most rational principles. Warm irritating tinctures of myrrh, aloes, and euphorbium; mixtures of tinct. myrrh. with mel. Ægyptiac. and such kind of medicines, which are found to be frequently ordered, and indeed are frequently used, particularly in compound fractures produced by gun-shot, seem to me to be very opposite to such intention, and very little likely to produce or to contribute to the one thing which ought to be aimed at, I mean the establishment of a kindly suppuration. I know what is said in answer to this; *viz.* that such kind of stimulus assists nature in throwing off the diseased parts: but this is a kind of language, which I believe will be found upon examination to have been first used without any sufficient or good ground, and to have been echoed ever since upon trust. It had its foundation in the opinion that gun-shot wounds were poisonous, and that the mortification in them was the effect of fire, and it has been continued ever since, to the great detriment of many a sufferer. A gun-shot wound, whether with or without fracture, is a wound accompanied with the highest degree of contusion, and with some degree of laceration; and every greatly contused and lacerated wound requires the same kind of treatment which a gun-shot wound does, as far as regards the soft parts. The intention in both ought to be to appease pain, irritation, and inflammation, to relax the indurated, and to unload the swollen parts, and by such means to procure a kindly suppuration, the consequence of which must be, a separation of the diseased parts from the sound. Now whether this is likely to be best and soonest accomplished by such dressings and such applications as heat and stimulate, and render the parts to which they are applied crisp and rigid, may fairly be left to common sense to determine.

Scarification, in the manner and at the time in which it is generally ordered and performed, has never appeared to me to have served any one good purpose. When the parts are really mortified, incisions made of sufficient depth will give discharge to a

quantity of acrid and offensive ichor; will let out the confined air, which is the effect of putrefaction, and thereby will contribute to unloading the whole limb; and they will also make way for the application of proper dressings. But while a gangrene is impending, that is, while the parts are in the highest state of inflammation, what the benefit can be which is supposed or expected to proceed from scratching the surface of the skin with a lancet, I never could imagine; nor, though I have often seen it practised, do I remember ever to have seen any real benefit from it. If the skin be still sound, and of quick sensation, the scratching it in this superficial manner is painful, and adds to the inflamed state of it: if it be not sound, but quite altered, such superficial incision can do no possible service. Both the sanies and the imprisoned air are beneath the membrana adiposa; and merely scratching the skin in the superficial manner in which it is generally done, will not reach to, or discharge either.

From what has been said, it will appear, that there are three points of time, or three stages of a bad compound fracture, in which amputation of the limb may be necessary and right; and these three points of time are so limited, that a good deal of the hazard or safety of the operation depends on the observance or non-observance of them.

The first is immediately after the accident, before inflammation has taken possession of the parts. If this opportunity be neglected or not embraced, the consequence is either a gangrene or a large suppuration, with formation and lodgement of matter. If the former of these be the case, the operation ought never to be thought of, till there is a perfect and absolute separation of the mortified parts. If the latter, no man can possibly propose the removal of a limb, until it be found, by sufficient trial, that there is no prospect of obtaining a cure without, and that, by not performing the operation, the patient's strength and life will be exhausted by the discharge. When this becomes the hazard, the sooner amputation is performed the better. In the first instance, the operation ought to take place before inflammatory mischief is incurred; in the second, we are to wait for a kind of crisis of such inflammation; in the third, the proportional strength and state of the patient, compared with the discharge and state of the fracture, must form our determination.

*** In my account of the double bed, which is mentioned in a preceding note, it will be found that it not only is conducive to cleanliness and health, but that it affords great relief to both patient and surgeon on many occasions, and is particularly interesting on the present subject of compound fractures. In these cases, as is well known to practitioners, patients are often obliged to remain in their beds during many months, while disunited bones and loose splinters cause inflammation and abscesses, which furnish a discharge in such quantity as daily to inundate the bandages and pillows.

The necessary changing and renewal of these has hitherto been done at the expence of the surgeon's back, who in a stooping painful posture is obliged to support the heavy limb, often with the additional weight of splints and bandages, (for he dares not trust it in other hands,) while all the necessary apparatus is replacing. This must be done by his direction; and often in a hurry to save himself, as well as his patient, for his fatigue must necessarily increase every instant, his hands must become unsteady, and the fractured bones will consequently be often jarred and displaced, which cannot fail of bringing on fresh pain and inflammation, and retarding the cure. For fear of a repetition of all this trouble, both patient and surgeon readily incline to put off the evil day till filth and putrid effluvia make it absolutely necessary to be renewed.

Whatever can tend to remedy or remove this great inconvenience, must, I presume, be esteemed a valuable acquisition by all parties concerned—surgeons, patients, and their attendants; and I have great pleasure in saying that this may be effected by the double bed. The bar which is added to it reaching from head to foot at a proper height above the bed, and the ends of it turning down and being fixed in the two uprights which occasionally raise the upper bed, will give a firm bearing, on which the limb may at any time be suspended in a proper cradle or bandage, while the nurses and attendants remove the dirty pillows, cleanse the bed, and get every thing ready, while the surgeon is prepar-

ing his apparatus, to replace it at his leisure, without hurry, trouble, or fatigue.

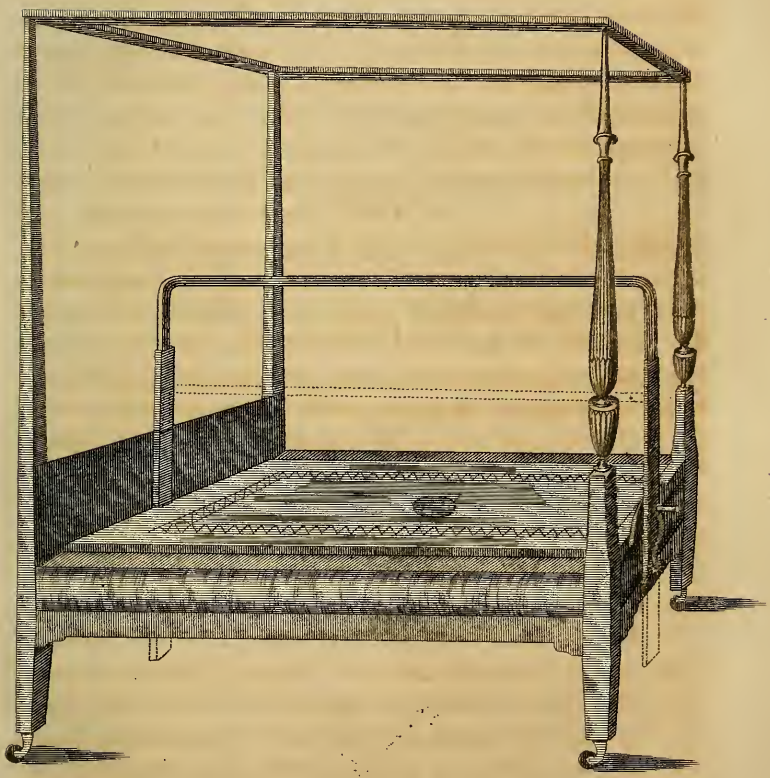
This, though a valuable, is but a secondary use of the bar; as it was originally intended to raise the body of the patient, which may be slung on it either by broad girths introduced under him; or, if that cannot be done, by the sheet on which he lies, the corners of it being tied over the bar. The uprights then being disengaged from their connexion with the upper bed, and the handle being turned, the bar will be raised with the person attached to it, and the upper bed will remain, on which may be put fresh sheets, or what may be wanted: he will then be let down again, and the sheet he has used may be drawn from under him; for it is easy to draw or cut one away, though difficult to introduce a clean one, while a person is lying in bed.

Many other purposes may be served by this bar—for instance, if there should be a wound or other complaint in the back, or parts which could not be seen while the patient was lying down, when he is by these means raised up, it may be examined, and applications made to it, and other good effects may be produced by the bar, which are noticed in the pamphlet. When the bar is not wanted, it may be laid aside. E.

PLATE III.

In Plate III. is shown the bar, which has been described, raised up and reaching from head to foot: it is fixed laterally in grooves made in the two uprights which occasionally raise the upper bed, but in the present view they are unconnected with it, and merely act on the bar.

The dotted line marks how low the bar may be made to descend, in order to receive any weight which may be attached to it, and which, with a steady smooth movement, may be raised to any degree, from one inch to twenty, or higher if required.



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OF DISLOCATIONS IN GENERAL.

The principle inculcated so frequently in some of the foregoing pages, concerning the extended or relaxed, that is, the resistant or non-resistant state of the muscles, as depending on the position of the limb, may be applied with equal truth and equal advantage to dislocations, as to fractures. Neither of them can indeed be rightly understood or judiciously treated without such consideration. In both, a perfect knowledge of the disposition, force, attachments, and uses of the muscles, at least those of the limbs, are absolutely and indispensably necessary: and if the young students would be careful in attending to the plain and obvious parts of anatomy; if they would with their own hands dissect the muscles, tendons, blood-vessels and nerves; if they would examine minutely the structure, dispositions, and connexions of all the parts which form the various joints, with their ligaments, and attend to the effects which the actions of the muscles and tendons connected therewith must necessarily have on them, they would have much more precise and adequate ideas of luxations, than many of them have; they would have ideas of their own, not taken upon trust from writers, who have for ages done little more than copy each other; and they would act with much more satisfaction to themselves.

By what our forefathers have said on the subject of luxations, and by the descriptions and figures which they have left us of the means they used, of what they called their organa and machinemata, it is plain that force was their object, and that whatever purposes were aimed at or executed by these instruments or machines, were aimed at and executed principally by violence.

Many, or most of them indeed, are much more calculated to pull a man's joints asunder, than to set them to rights. I will not go so far as to say, that they are all equally bad or improper; but I will venture to affirm, that hardly any of them are so con-

trived as to execute the purpose for which they should be used, in a manner most agreeable, or most adapted to the nature or mechanism of the parts on which they are to operate, or to accomplish such purpose in the most easy and most practicable manner; and consequently, as I have already said, they act by force principally.

Nor is that all: some of them labour under another defect, and that capable of producing great mischief; which is, that the force or power of the instrument is not always determinable, as to degree, by the operator, and consequently may do too little or too much, according to different circumstances in the case, or more or less caution or rashness in the surgeon.

I know very well that many of these are now laid aside, and that some few have been so altered, as to become useful; but still the same kind of principle, on which these instruments were originally founded and constructed, very generally prevails, and violence is used, to the great fatigue, pain, and inconvenience of the patient in many cases, in which dexterity, joined to a knowledge of the parts, would execute the same purpose with facility and ease.

In dislocations, as in fractures, our great attention ought to be paid to the muscles belonging to the part affected. These are the moving powers, and by these the joints, as well as other moveable parts, are put into action: while the parts to be moved are in right order and disposition, their actions will be regular and just, and generally determinable by the will of the agent (at least in what are called voluntary motions); but when the said parts are disturbed from that order and disposition, the action or power of the muscles does not therefore cease: far from it, they still continue to exert themselves occasionally; but instead of producing regular motions, at the will of the agent, they pull and distort the parts they are attached to, and which by being displaced cannot perform the functions for which they were designed.

From hence, and from hence principally, arise the trouble and difficulty which attend the reduction of luxated joints. The mere bones composing the articulations, or the mere connecting ligaments, would in general afford very little opposition; and the replacing the dislocation would require very little trouble or force,

was it not for the resistance of the muscles and tendons attached to and connected with them; for, by examining the fresh joints of the human body, we shall find that they not only are all moved by muscles and tendons, but also, that although what are called the ligaments of the joints do really connect and hold them together, in such manner as could not well be executed without them, yet, in many instances, they are, when stripped of all connexion, so very weak and lax, and so dilatable and distractile, that they do little more than connect the bones and retain the synovia; and that the strength, as well as the motion of the joints, depends in great measure on the muscles and tendons connected with and passing over them; and this in those articulations which are designed for the greatest quantity, as well as the celerity of motion. Hence it must follow, that as the figure, mobility, action, and strength of the principal joints, depend so much more on the muscles and tendons in connexion with them, than on their mere ligaments; that the former are the parts which require our first and greatest regard, these being the parts which will necessarily oppose us in our attempts for reduction, and whose resistance must be either eluded or overcome; terms of very different import, and which every practitioner ought to be well apprised of.

From the same examination is to be obtained a kind and degree of very useful information, which the skeleton cannot afford. I mean an acquaintance with the ligaments themselves, both external and internal; the cartilages, both fixed and moveable; and the parts furnishing what is called the synovia.

This, to those who are perfectly acquainted with the subject, may seem too obvious to have needed mention; but no one who has not examined the joints can possibly have this kind of necessary knowledge; and I am convinced that there are many practitioners who have no idea of articulations, but what the assemblage of dry bones has furnished them, and which must be very inadequate.

I have neither leisure nor inclination at present to enter into this matter minutely, or indeed as it deserves; beside which, I have, I fear, sufficiently exercised my reader's patience already in the foregoing sheets. I will therefore detain him no longer than while I mention a few leading principles relative to luxations in

general, drawn from the structure of the parts concerned, and which appear to me to be applicable, with very little if any variation, to every particular species.

1. Although a joint may have been luxated by means of considerable violence, it does by no means follow, that the same degree of violence is necessary for its reduction.

2. When a joint has been luxated, at least one of the bones of which it is composed is detained in that its unnatural situation by the action of some of the muscular parts in connexion with it; which action, by the immobility of the joint, becomes, as it were, tonic, and is not under the direction of the will of the patient.

3. That the mere bursal ligaments of some of the joints, endued with great mobility, are weak, distractile, and constantly moistened; that for these reasons they are capable of suffering considerable violence without being lacerated; but that they are also sometimes most certainly torn.

4. That, did the laceration of the said ligaments happen much more frequently than I believe it does, yet it cannot be a matter of very great consequence, as it neither totally prevents reduction, when timely and properly attempted, nor a consequent cure.[f]

5. That, supposing such accident to be frequent, yet as it is impossible to know, with any kind of certainty, whether it has happened or not, or in what part of the ligament, it cannot be ad-

[f] In the accident of a dislocated tibia, in consequence of a broken fibula, the strong, inelastic, tendinous ligaments, which fasten the end of the former bone to the astragalus and os calcis, are frequently torn; and as these by proper care almost always do well, and recover all their strength, there is the greatest reason to expect, that the more weak, distractile ones do the same. The only mischief which seems most likely to follow from a laceration of the latter, is from an effusion of the synovia; of which I think I have (in a bad habit) seen an instance in the joint of the ancle. That the laceration of the bursal ligament of the shoulder cannot be a frequent or general impediment to reduction, appears to me, from my never having, in more than twenty years' care of an hospital, met with a single instance of its impracticability, when attempted in time.

For it can hardly be supposed, that such kind of accident should never have fallen to my lot, or to the people who have acted under me.

But even if this could be supposed, I can also say, that I do not remember impossibility of reduction to have happened to any of the other gentlemen of the house, under the same circumstances.

mitted as a rule for our conduct, nor ought such mere conjecture to produce any deviation from what we ought to do, were there no such supposition. Could we know with certainty when and where this had happened, very useful information might indeed be drawn from it.

6. That all the force used in reducing the luxated head of a bone, be it more or less, be it by hands, towels, ligatures, or machines, ought always to be applied to the other extremity of the said bone, and as much as possible to that only.

In every joint capable of dislocation, the same circumstance which renders it liable to be displaced, is also a very considerable assistance in its reduction. I mean the dilatability or distractile power of the ligaments, their capacity of giving way when stretched or pulled at.

This is perhaps the strongest argument which can be produced, why all the force made use of in reducing a dislocated joint should be applied to that bone only, and not to the next. By the yielding nature of the ligaments of the luxated joint, reduction is to be accomplished. The ligaments of the other articulation, which is not luxated, are yielding also; and all the force which is applied to the bone below or adjoining, must necessarily be lost in the articulation which is not luxated, and can be of little or no service in that which is.

Let this principle be applied to the dislocation of the joint of the shoulder, and it will shew us why the ambi, in which the whole arm is tied down, and subjected to the extending power of the said instrument, is defective, and may be pernicious. Why instruments built on the same general principle, but in which the fore-arm is not fastened down, but left at liberty, and not subjected to the ligature, execute their purpose with a great deal less force. Why the vulgar but frequently very successful method of reducing this joint, by placing the operator's heel in the axilla of the supine patient, sometimes fails, the surgeon not having proper assistance, and contenting himself with pulling at the patient's wrist only. It will also shew us, why, in the case of a luxated os femoris at the joint of the hip, the strength of five or six people divided between joint of the knee and that of the ancle, shall be insufficient; and that of four, nay three of the same assistants, shall in the same

case prove sufficient, by being all and properly applied to the knee and femur only, as I have more than once seen.

Many other applications of this principle might be made, but these are sufficient to those who understand the principle itself and see its force.

7. That in the reduction of such joints, as are composed of a round head, received into a socket, such as those of the shoulder and hip, the whole body should be kept as steady as possible, for the same reason as in the foregoing.

8. That in order to make use of an extending force with all possible advantage, and to excite thereby the least pain and inconvenience, it is necessary that all parts serving to the motion of the dislocated joint, or in any degree connected with it, be put into such a state as to give the smallest possible degree of resistance.

This I take to be the first and great principle by which a surgeon ought to regulate his conduct in reducing luxations. This will show us why a knowledge of all the muscular and tendinous parts, acting upon, or in connexion with the articulations, is absolutely necessary for him who would do his business scientifically, with satisfaction to himself or with ease to his patient. It will shew us, that the mere position of the limb below the luxated joint, is what must either relax or make tense the parts in connexion with that joint, and consequently that posture is more than half of the business. It will shew us, why sometimes the luxated os humeri slips in, as it were, of its own accord, by merely changing the position of the arm, when very violent attempts, previous to this, have proved successless. It will shew us, why extending the arm in a straight line horizontally, or so as to make a right angle with the body, must, in some instances, render all moderate attempts fruitless. Why the method of attempting reduction by the heel in the axilla is so often successful, notwithstanding two very considerable disadvantages under which it labours; *viz.* part of the force being lost in the elbow, and the tense state of one head of the biceps cubiti. Why the tying down the fore-arm in the common ambi is wrong for the same reasons. Why the fore-arm should at all times, (let the method of reduction be what it may) be bent; *viz.* because of the resistance of the long head of the biceps in an extended posture. Why, when the os humeri is luxated forward.

or so that its head lies under the great pectoral muscle, the carrying the extended arm backward, so as to put that muscle on the stretch, renders the reduction very difficult; and why, on the contrary, the bringing the arm forward, so as to relax the said muscle, removes that difficulty, and renders reduction easy. Why the reduction of a luxated elbow should always be attempted by bending the said joint. Why, when the inner ancle is dislocated in consequence of a fracture of the fibula, it is extremely difficult at all times, and sometimes impracticable, either to reduce or to keep reduced the said joint, while the leg is in an extended posture; and why a bent posture of the leg enables us with ease to accomplish both those ends. Why in the case of dislocation of the head of the os femoris, (be it in what manner it may,) a straight position of the leg and thigh will always increase the difficulty of reduction; and why that very distorted and bent position, in which the patient will always place it for his own ease, is and must be the posture most favourable for reduction; because it is and must be that posture in which the muscles, most likely to make opposition, are most relaxed, and rendered least capable of resistance.[g]

9. That in the reduction of such joints as consist of a round head moving in an acetabulum or socket, no attempt ought to be made for replacing the said head, until it has by extension been brought forth from the place where it is, and nearly to a level with the said socket.

This will show us another fault in the common ambi, and why that kind of ambi, which Mr. Freke called his commander, is a much better instrument than any of them, or indeed than all; because it is a lever joined to an extensor; and that capable of being used with the arm, in such position as to require the least exten-

g In the attempts for reduction of a luxated hip, there is one circumstance, which, by being overlooked, or not attended to, has more than once rendered every effort vain.

It is usual, and indeed necessary, to tie down and confine the patient on a bed or table, in order to keep his body firm and steady: one part of the bandage or strapping by which he is confined is fixed in the groin, and, passing over his belly and under his buttock, is fastened above, or rather beyond, his head, to something immovable. If this bandage be placed (as I have seen it) in the groin on the side of the luxated bone, it will prove so far from being assistant, that it will necessarily frustrate every attempt.

sion, and to admit the most; beside which it is graduated, and therefore perfectly under the dominion of the operator.

It will show us, why the old method by the door or ladder sometimes produced a fracture of the neck of the scapula, as I have seen it do in our own time.

Why, if a sufficient degree of extension be not made, the towel over the surgeon's shoulder, and under the patient's axilla, must prove an impediment rather than an assistance, by thrusting the head of the humerus under the neck of the scapula, instead of directing it into its socket.

Why the bar or rolling-pin under the axilla produce the same effect.

Why the common method of bending the arm (that is, the os humeri) downward, before sufficient extension has been made, prevents the very thing aimed at; by pushing the head of the bone under the scapula, which the continuation of the extension for a few seconds only would have carried into its proper place.

I know it is said, that mere extension only draws the head of the bone out from the axilla, in which it was lodged, but does not replace it in the acetabulum scapulæ. To which I will venture to answer, that when the head of the os humeri is drawn forth from the axilla, and brought to a level with the cup of the scapula, it must be a very great and very unnecessary addition of extending force, that will or can keep it from going into it. All that the surgeon has to do is to bring it to such level: the muscles attached to the bone will do the rest for him, and that whether he will or not.

Indeed, if all the rational means and methods for reducing a luxated shoulder be examined, they will be found to act upon this principle, however differently this matter may appear to those who have not attended to it. Even the common ambi succeeds by means of the extension, which the carrying the arm down with it produces, and not by its lever. That part of the instrument, so far from helping, is often a considerable hinderance, and even sometimes frustrates the operator's intention, by pushing the head of the bone against the scapula, before it is sufficiently drawn out from the axilla.

If it was necessary to add any thing in support of this doctrine,

I should say, that the supposition of laceration of the bursal ligament being a circumstance frequently attending this luxation, and proving an impediment to reduction, is a strong inducement to us to be always attentive to the making such extension, it being much more likely that the head of the bone should return back by the same rent in the ligament, when such ligament is moderately stretched out, than when it may be supposed to lie wrinkled or in folds.

10. The last principle which I shall take the liberty to mention, and which I would inculcate very seriously, is, that whatever kind or degree of force may be found necessary for the reduction of a luxated joint, that such force be employed gradually, that the less degree be always first tried; and that it be increased *gradatim.*

Whoever reflects on what is intended by extension, what the parts are which resist, and how that resistance may be best overcome, will want little argument to induce him to accede to this principle; the advantages deducible from attending to it, and the disadvantages which may and do follow the neglect of it, are so obvious.

They who have not made the experiment will not believe to how great a degree a gradually increased extension may be carried without any injury to the parts extended; whereas great force, exerted hastily, is productive of very terrible, and very lasting mischief.

I know that the vis percussionis, as it is called, has been recommended as having been successful in some difficult luxations; but I have seen such bad consequences from it, that I cannot help bearing my testimony against it. The extensile and distractile quality of the membranes, muscles, and ligaments, enables them to bear the application of very great force to them, without hurt, if such force be applied gradually, and proper time be allowed for the parts to give way in; but great force, suddenly applied, is capable of producing the most mischievous consequences; and that in many other parts of surgery, beside what relates to luxations.[h]

[h] I shall take the liberty to remark here, that in obstinate and difficult dislocations, the least painful and most effectual method of reducing them ap-

pears to me to be by means of a pulley, by which the extension may be made in any direction; and the force may be applied with precision, as gradually and to as great a degree as may be thought necessary, by the assistance of one person only, which is infinitely preferable to a number of people pulling in different directions. Even in an hospital, where there are a sufficient number who all know what they are about, and what end is to be answered, many hands must pull irregularly, as they draw from different points; and this inconvenience must be much greater in private practice, where the assistants are ignorant and awkward. The patient may also be kept more firm and steady, by means of a broad leathern belt, lined with soft flannel, which surrounds the thorax, and is fixed to a post or some immovable body, than by any number of assistants, making a counter extension. This plan, I am convinced, is preferable to the ambi, or any means I have ever seen employed in obstinate cases of dislocated humeri, and may be applied very advantageously to luxations of the os femoris. By the methods commonly in use, the limbs are often so bruised and excoriated, that, if the reduction be not effected by the first, a considerable time is lost before the inflammation can be sufficiently dissipated to permit another attempt. The thick buff leather which guards the skin from the pressure of the chord of the pulley, prevents such disagreeable consequences from taking place. E.

A

TREATISE

ON

RUPTURES.

PREFACE.

The disease which makes the subject of the following tract, is one in which mankind are, on many accounts, much interested. No age, sex, rank, or condition of life, is exempt from it; the rich, the poor, the lazy, and the laborious, are equally liable to it; it produces certain inconvenience to all who are afflicted by it; it sometimes puts the life of the patient in such hazard, as to require one of the most delicate operations in surgery; and it has in all times, from the most ancient down to the present, rendered those who labour under it subject to the most iniquitous frauds and impositions.

The generality of mankind look upon a rupture as an imperfection in their form, as a disease which impairs their strength, and lessens their generative faculty: which apprehensions, though absolutely groundless, are so firmly rooted in the majority of those who are afflicted with the disorder, as to make them not a little miserable. They who lie in wait to avail themselves of the weaknesses of the infirm and fearful, are well acquainted with these fears, and very lucrative use do they make of them. They well know, that the man who regards his disorder as an imperfection in his form, or as a cause of any debility, more particularly a venereal one, will be very unwilling to have it known, and as glad to get rid of it, at any expense or trouble: by this means these impostors are furnished with opportunities of subjecting the ignorant and credulous to tedious confinements, painful applications,

and even hazardous operations; and of defrauding the timorous and bashful of large sums of money, for imaginary diseases, and pretended cures.

Complaints of this sort, coming from the profession, are generally ill received; and, being set to the account of prejudice, interest, and craft, are very little regarded; but in this mankind do us great injustice. A rupture is a disease, which, if judiciously and honestly treated from the first, can never be productive of much profit to a surgeon; it requires very little attendance, and neither external application nor internal medicine. Though the reduction of the gut, and the application of a proper bandage, are necessary, yet this is in general so soon and so easily accomplished, that it must be obvious that no great emolument can from thence be derived; and therefore, if the profession may be allowed to be impartial in any thing which relates to themselves, I think they may in this, from which they never can reap considerable profit, unless the disease has been greatly neglected, or ill-treated. It is from fraud and delusion principally that such advantage can be derived; it is from the patient's ignorance of the true nature of his disorder, and from bold and lying promises made of a perfect cure.

It is far from my intention to defend the body of surgeons from any accusation which may justly be brought against them; but as the reason given by most of the patrons of quackery for their supporting it, is, that the medical world, through mere obstinacy, never depart from the customs of their ancestors, nor attempt any thing new, though mankind might be much benefitted by such inventions; and as I think that such imputation cannot with any colour of justice be made against us, I would beg leave to be indulged a few words on this subject.

That the merit of many of the old practitioners was great; that they left behind them many proofs both of their sagacity and their

dexterity; that we have received large information from their writings; and that, *cœteris paribus*, he who is best acquainted with them will be the best surgeon, is well known to every one who is at all conversant with them, and can be denied only by those who are not. But, on the other hand, it must also be allowed, that both their theory and their practice laboured under great disadvantages, which rendered their judgment of many diseases erroneous, and their treatment of them irrational and unsuccessful.

The very imperfect state of their anatomy was one great source of error; which kind of knowledge has been so cultivated in our times as to convert ignorance into a vice, and to render those who are deficient in it perfectly inexcusable.

As this is the only true and solid basis from which all chirurgical knowledge must for ever spring, so it has of late years been productive of many real and great improvements in the art.

The ancient surgery was coarse, and loaded with a farrago of external applications, some of which were horridly, and yet unnecessarily painful, and others altogether useless; whilst the operative part of the art was encumbered with a multitude of awkward unmanageable instruments, and pieces of machinery.

The practitioners of the present time have brought the practice into a much narrower compass, have rendered it less painful and more intelligible; they have reduced the number of instruments, and by the extreme simplicity of those which they now use, they have considerably assisted the dexterity of an operator, and shortened the time of an operation; they have almost thrown aside the burning cautery, and are much more sparing in the use of caustic applications than their predecessors used to be; they now accomplish many cures by mild and gentle means, which formerly were thought not obtainable but by much severity; to say nothing of the indelible marks which such practice left behind it. The havoc formerly made both of limbs and lives, by

the use of long forceps in gun-shot wounds; the explosion of the long-prevailing notion that such wound were poisonous; the easy superficial method in which they are now in general treated, and the opportunities which such treatment gives for nature to exert those powers with which the Almighty Author has furnished her, do credit to the modern practitioners; the double incision in amputations; the present method of removing cancerous breasts, and encysted tumours; the lateral operation for the stone in the bladder; the use of the cutting gorget; amputation in the joint of the shoulder; the present method of letting out all the water at once from an ascites; the improvements in the treatment of the fistula lachrymalis; the cure of the vari and valgi, with many others which might be named; in short, the superior neatness, ease, and expedition of the present surgery, when compared to the ancient, are certain and undoubted improvements made by the modern practitioners, and such as mankind are much benefitted by, as their pains are thereby lessened, the elegance of their figure preserved, and the time of their confinement shortened; all which will, I presume, be allowed to be advantages, while human nature shall remain sensible of pain, while scars shall be thought deformities, or confinement be deemed irksome.

Nor is our conduct, with regard to the particular disease which makes the subject of the following tract, in the least degree blameable; so far from it, that the treatment which we meet with sometimes is most singularly unjust, we being often severely censured for that from which we ought to derive praise: so little do we deserve the reflection cast upon us, of being content with what our fathers taught us, and neither improving the art ourselves, nor encouraging those who do: that, on the contrary, much pains have been taken to improve this particular part of surgery, and the public ought to thank us for not persevering in the use of the old, tedious, painful, and hazardous processes, after we found them to be in general ineffectual.

But though I would at all times vindicate the profession from every unjust attack, I would by no means be supposed to think that there is not large room left for the industry both of us and our successors; some of the operative parts of the art are still capable of improvement, and the treatment of some diseases might certainly be altered for the better.

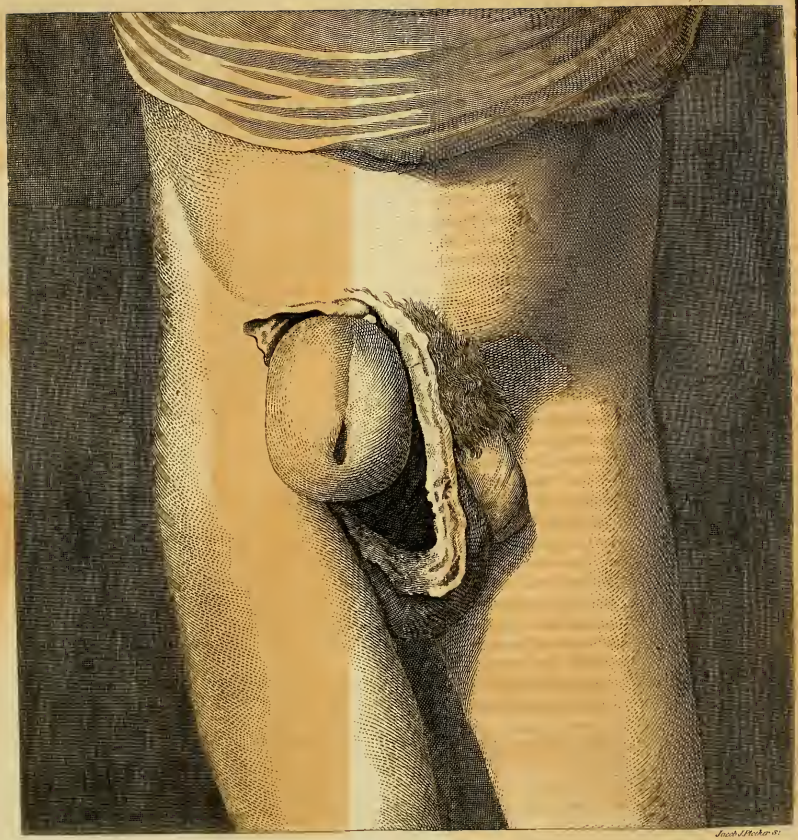
Whether our future labours shall be crowned with success or not, still I think it will appear to every one at all versed in the history of surgery, that the practitioners of the present time are so far from deserving the character which they who know nothing of the art have given of them, that they really deserve a very contrary one; since instead of obstinately adhering to the practice of their ancestors, they have differed from it in many instances, where they found they could do it with safety, and to the advantage of mankind; and have endeavoured to advance the utility of their profession, by the only means whereby it is capable of being improved, *viz.* by a sedulous application to anatomy, by the frequent examinations of dead morbid bodies, and by making such experiments on the living, as they had just reason to think would prove beneficial; candidly acknowledging at the same time, where they have found their art insufficient, and not persisting in tormenting their fellow-creatures merely for gain.

In the following treatise I have endeavoured to express myself in as plain, explicit, and intelligible a manner as I am able, and the subject will admit; being desirous as much as I can to inform mankind of the true nature of the disease, of the danger they incur, and the frauds they are liable to, from the ignorance of one set of quacks, and the worse qualities of another: to show what the art of surgery in judicious hands is capable of doing, and how essentially the conduct of an impostor differs from that of an honest man, who will never be ashamed of confessing that he can not do what is not in his power.

In the first edition of this book were many faults; some of the press, some of the author: in this some pains have been taken to lessen both. Of typographical errors very few, if any, will, I hope, be found; and wherever it has appeared to me that the matter of the treatise was obscure, erroneous, or deficient, I have altered, corrected, and added to it.

I am still far from thinking that it is perfect or faultless; but on the other hand, I am not conscious of having advanced any thing in it which is not strictly true, and agreeable to the most successful practice. Improvement of the art of surgery, and the relief of mankind, are my two principal objects; and if what I have now, or at any other time written, shall be found to have contributed toward accomplishing either of those ends, I hope the reader will excuse all those lesser faults,

——quas aut incuria fudit,
Aut humana parum cavit natura.



Jacob J. Fletcher Sc.

A TREATISE, &c.

SECT. I.

By the term RUPTURE, DESCENT, or HERNIA, is in general meant a swelling produced by the falling down or protrusion of some part or parts, which ought naturally to be contained within the cavity of the belly.

The places in which these swellings make their appearance, in order to form what is called a RUPTURE, are the groin, the navel, the labia pudendi, the upper and fore part of the thigh, and every point of the anterior part of the abdomen.

The parts, which, by being thrust forth from the cavity in which they ought naturally to remain, form these tumors, are a portion of the omentum, a part of the intestinal canal, and sometimes[a] (though very rarely) the stomach.

From these two circumstances, of situation and contents, are derived all the different appellations by which herniæ are distinguished: for example, they are called *inguinal*, *scrotal*, *femoral*, *umbilical*, and *ventral*, as they happen to make their appearance in the groin, scrotum, thigh, navel, or belly. If a portion of intestine only forms it, it is called *enterocele*, *hernia intestinalis*, or gut-rupture; if a piece of omentum only, *epiplocele*, *hernia omentalis*, or caul-rupture; and if both intestine and omentum contri-

[a] The liver, spleen, uterus, bladder, &c. have at different times been found in different herniæ, but these are so rare as not to come within a general description.

bute mutually to the formation of the tumor, it is called *enteroepiplocele*, or compound rupture.

If the piece of gut or caul descends no lower than the groin, it is said to be incomplete, and is called *bubonocele;* if the scrotum be occupied by either of them, the rupture is said to be complete, and bears the name of *oscheocele:* the latter used by our forefathers to be attributed to laceration of the peritoneum, the former to its dilatation merely.

The opinion, that the scrotal hernia is occasioned by a forcible division, or breach made in the peritoneum, has always been, and still is, with the unknowing, a very prevailing one, though without any foundation in truth; both the scrotal and femoral pass out from the abdomen by openings which are natural to every human body; as well those who have not ruptures, as those who have. The former, that is the scrotal, descend by means of an aperture in the tendon of the external oblique muscle, near the groin; designed for the passage of the spermatic vessels in men, and the ligamenta uteri in women; and the latter, under the hollow made by Poupart's, or Fallopius's ligament, at the upper part of the thigh, along with the great crural vein and artery.

The pair of muscles called obliqui externi ascendentes, cover all that part of the belly which is without bone, and the lower and anterior parts of the thorax. They are fleshy on the sides, and tendinous in the middle and lower part; they spring from the seventh and eighth ribs, and from all below them, by fleshy portions which indigitate with corresponding parts of two other muscles, called the serratus major anticus, and the latissimus dorsi, and becoming tendinous, are inserted into what is called the linea alba, the spine of the os olium, and into the os pubis.

At the lower part of the belly, on each side, a little above the last mentioned bone, the fibres of the tendon of this muscle separate from each other, and form thereby two apertures, through which pass the spermatic vessels in men, and the ligamenta uteri in women. These openings are of an oval figure, and have an oblique direction from above downward: the upper part of them

is rather wider than the lower, and they are of larger size in men than in women.[b]

The tendinous fibres of this muscle, as they proceed from its fleshy part obliquely downward, have several small apertures for the passage of vessels and nerves; and at their insertion into the os pubis, they cross one another, and are as it were interwoven, by which means their insertion is strengthened, and their attachment made firmer.

What is called by the particular name of Poupart's ligament is really nothing more than the lower border of this tendon, stretched from the fore part of the os ilium, or haunch bone, to the os pubis, and turned or folded inward at its interior edge.

The other muscles of the belly are the obliquus internus, the transversalis, the rectus, and the pyramidalis, none of which have any concern with our present subject. The spermatic chord does indeed pass under the lower edge or border of the two first of these, but at such a distance, and in such manner, that no action of these muscles can any way affect, or ever make any stricture either on it, or on a hernia accompanying it; they have no perforations, or apertures, though so many writers of credit (even late ones) have both described and delineated them,[c] consequently

[b] A detachment of fibres from the fascia lata of the thigh is generally united with the tendon composing the aperture in the obliquus externus, which mixture or connexion of fibres will in some measure account for the pain which they who labour under strangulated ruptures feel upon standing upright, and the relief which bending the thigh upward toward the belly always gives them.

[c] However incredible and strange it may seem, yet I am convinced, that operations have been performed by the information obtained from books only, without any previous anatomical knowledge, any practice on dead bodies, and barely any, if any, opportunities of seeing such operations performed by others on the living: how grossly must such an operator be deceived by the account of the rings, as they are usually, though absurdly called, of the abdominal muscles: after he has divided the first, or that of the external oblique, he will expect to find a second in the internal, and a third in the transversalis, and will never suppose that he is got into the cavity of the belly, till he has divided all the three: it is therefore of the utmost consequence that this matter be set right, and that, notwithstanding what has been said on this subject by writers of great eminence, every surgeon be informed that the external oblique muscle is the only one which has any opening in it; that the

they can have no share in the embarrassment of the parts contained in a hernial sac, nor require any division in that operation, which becomes sometimes necessary towards setting them free: which is a fact of no small consequence to an operator.

The inside of these muscles, and indeed the whole cavity of the belly, is lined with a smooth, firm, but easily dilatable membrane, called the peritoneum, a minute account of which would lead me beside my present purpose, and therefore I shall only observe, that it lines the whole abdomen, and gives an external coat to every viscus contained in it.

Behind the peritoneum lies a loose, cellular membrane, by some called its appendix, which is found in different quantity in different places. In some the cells are empty, and are immediately visible upon being blown into; in other parts it is plentifully stocked with fat, and, though somewhat varied in its appearance in different places, is found in most parts of the body.

This cellular membrane, void of fat, surrounding the spermatic vessels, as they pass forth from the cavity of the abdomen into the groin, is called the tunica vaginalis of the chord, or tunica communis vasorum spermaticorum; which chord, thus enveloped, passing under the inferior edge or border of the transversalis, and internal oblique muscles, and through the perforations or natural apertures of the external oblique, descends through the groin to the testicle, in such manner, that the spermatic vessels in their passage from the cavity are really and truly behind the peritoneum.

The tunica vaginalis testis is a membrane perfectly distinct from this, forming a particular cavity, which includes the glandular substance of the testicle, and has nothing to do with a common rupture. In every fœtus, until, or very near until the time of birth, there is an open and free communication between the cavity of this last tunic, and that of the belly, for the passage of the testicle from the abdomen into the scrotum: soon after birth

description given by Mr. Cheselden of these muscles, in the last edition of his anatomy, is erroneous; and all descriptions and all delineations (some of which are to be found even in later writers) of more openings than that single one on each side, are not representations of nature, but are the images of a luxuriant fancy, and have no foundation in truth.

this passage closes and becomes impervious; nor is there ever after the time of such closing, any communication between the cavity of the belly, and that of the tunica vaginalis testis. But though the passage remains in general for ever shut, yet the place where its orifice, or mouth, was, may always be known by a kind of cicatricula, much like to what appears within the abdomen, opposite to the navel, or place where the umbilical vessels of the fœtus passed to and from the placenta; at the place of which cicatricula, the peritoneum is generally weaker than elsewhere. Now, if it be remembered, that this weak part is necessarily opposite to the natural opening in the tendon of the external oblique muscle; that neither the internal oblique muscle, nor the transversalis, comes low enough to make any resistance to whatever shall press against this part; and that the acknowledged use of the muscles of the abdomen is by pressing on all its contained viscera to assist digestion, the expulsion of the fæces, urine, and fœtus; (and that in many natural actions, such as sneezing and coughing, &c. and in all great exertions of strength and force, our erect posture must necessarily occasion a pressure to be made against the lower part of the inside of the belly, by some of its contents;) a very probable and satisfactory account of the origin of the common inguinal and scrotal hernia may be collected.

In young children, this descent or protrusion happens most frequently when the child strains in crying, or in expelling its fæces; as soon as the effort ceases, and the child is quiet, the part generally returns up again, and the swelling disappears. The nurses call it wind, and it is at first most frequently neglected, as the child is not apparently injured by it, and few people are sufficiently aware of its possible consequences.

Not that the disease is by any means confined to children; adults frequently are attacked by it, either by falls, strains, great exertions of strength, difficulty of expelling hard fæces, or a general laxi y of frame.

Whether the rupture be inguinal, scrotal, or femoral, and whether it consists of intestine, or omentum, or both, the protruded part must carry before it a part of the membrane which lines all the internal surface of the abdominal muscles, or rather the whole cavity of the abdomen, and is called peritoneum. This portion of

the peritoneum, including the piece of gut or caul, is known by the name of the *hernial sac*, and is larger, or smaller, according to the quantity of intestine, or omentum, contained in it: it is at first small and thin, and in ruptures which are not of the congenial kind, seldom comes lower than the groin[d] at first, but by repeated descents it extends itself lower and lower, till it gets quite into the scrotum, and still as it is extended in length, it becomes thicker and firmer in texture, till in old age, or old ruptures, it is found of very considerable thickness.

As all parts of the peritoneum are of a very extensible, dilatable nature, and as the hernial sac has this property in common with many other parts of the body, of thickening as it extends, it does in some cases stretch to a very considerable size, and contain such a quantity of intestine and omentum as is almost incredible. This circumstance of its becoming thicker as it is more extended, is perhaps the reason why some people, and among them the late Mr. Cheselden, have been of opinion that the sac of a hernia was not an elongation of the peritoneum, but produced like that of an aneurism, and some other tumors, by mere pressure of the common cellular membrane; an opinion, which is manifestly and demonstrably erroneous.

Whether the hernial sac in its infant state, while it is very thin, and may possibly have contracted no adhesion to the cellular membrane composing the tunica communis of the spermatic vessels, does ever return back into the belly again, I will take upon me to determine absolutely; but am much inclined to think it does not, as well from the facility with which the gut or caul most commonly descends after they have been down a few times, as from a fulness which is always to be perceived in the spermatic process of such people as have ever been ruptured. Some few of these I have had opportunities of opening after death, and have always found the sac, either in the groin or scrotum, (plainly a continuation of the peritoneum,) remaining firmly attached to, and

[d] I will not say positively that all those ruptures which appear in the scrotum of very young children are congenial, (that is, have the tunica vaginalis testis for their hernial sac,) but all those which I have had an opportunity of examining have proved so; and I believe it would be no erroneous criterion, whereby to distinguish the common rupture from the congenial, in infants.

connected with, the tunica communis: nor did I ever see, either in the dead or the living, any reason or authority for the supposition, that it is capable of returning back into the abdomen after it has been fairly pushed out through the aperture in the tendon.[e]

I intentionally avoid saying any thing about the old doctrine of the difference between dilatation and laceration of the peritoneum, it being now generally known and acknowledged, that to whatever size the hernial sac may be extended, and however large its contents may be, it is merely dilated, and hardly ever burst or broken: the particular kind of case, which a few years ago gave rise to a sort of renewal of the old doctrine of ruptures by the laceration of the hernial sac, *viz.* that kind of hernia in which the gut and testicle are found in the same bag, and in immediate contact with each other, being now sufficiently known and explained. See Sec. X. of this Tract.

The signs, or marks, of a common inguinal or scrotal rupture, are in general a swelling in the upper part of the scrotum, or in the groin, beginning at the opening in the abdominal muscles where the spermatic vessels pass down from the belly; which tumor has a different appearance, and different feel, according to the nature of its contents, and to the state and quantity of them.

If a portion of intestine forms it, and that portion be small, the tumor is small in proportion; but though small, yet if the gut be distended with wind, inflamed, or have any degree of stricture made on it, it will be tense, resist the impression of the finger,

[e] This is a circumstance of some importance in the general treatment of ruptures. Upon it depends the truth or falsehood of the late doctrine of the possibility of returning the intestine included in the hernial sac, and confined by such a stricture of the sac itself, as may prove fatal after the gut is fairly got into the abdomen again. A case, of which more than one instance has been given to us, but in which I am much inclined to believe that some mistake has been made, and which I also think may be accounted for in another and more satisfactory manner. Upon this also depends the practicability or impracticability of returning a strangulated piece of gut back into the belly, after having divided the stricture made by the tendon, without opening the hernial sac, and consequently the propriety or impropriety of making such attempt. All endeavours to do what is impracticable, being, in cases of importance, much worse than doing nothing.

and give pain upon being handled. On the contrary, if there be no stricture made by the tendon, and the intestine suffers no degree of inflammation, let the prolapsed piece be of what length it may, and the tumor of whatever size, yet the tension will be little, and no pain will attend the handling it: upon the patient's coughing, it will feel as if it was blown into, and in general it will be found very easily returnable. If the hernia be of the omental kind, the tumor has a more flabby and a more unequal feel: it is in general perfectly indolent, is more compressible, gives the scrotum a more oblong and less round figure, than it bears in an intestinal hernia; and if the quantity be large, and the patient adult, it is in some measure distinguishable by its greater weight.

If it consists of both intestine and omentum, the characteristic marks will be less clear than in either of the simple cases, but yet will to any body who is accustomed to these diseases be sufficiently so, to enable them to distinguish it from any other complaint.

The only diseases with which a true hernia can be confounded, are the *venereal bubo*, the *hydrocele*, and that defluxion on the testicle, called *hernia humoralis;* from each of which it is certainly very distinguishable.

The circumscribed incompressible hardness, the situation of the tumor, and its being free from all connexion with the spermatic process, will sufficiently point out the first, at least while it is in a recent state; and when it is in any degree suppurated, he must have a very small share of the *tactus eruditus*, who cannot feel the difference between matter, and either a piece of intestine or omentum.

The perfect equality of the whole tumor, the freedom and smallness of the spermatic process above it, the power of feeling the spermatic vessels, and the *vas deferens* in that process, its being void of pain upon being handled, the fluctuation of the water, the gradual formation of the swelling, its having begun below and proceeded upwards, its not being affected by any posture or action of the patient, nor increased by his coughing or sneezing, together with the absolute impossibility of feeling the testicle at

the bottom of the scrotum,[f] will always, to any intelligent person, prove the disease to be a *hydrocele* of the *tunica vaginalis testis.* And in the hernia humoralis, the pain in the testicle, its enlargement, the hardened state of the epidydimis, and the exemption of the spermatic chord from all unnatural fulness, are such marks as cannot easily be mistaken; not to mention the generally preceding gonorrhea. But if any doubt still remains of the true nature of the disease, the progress of it from above downward, its different state and size in different postures, particularly lying and standing, together with its descent and ascent, will, if duly attended to, put it out of all doubt, that the tumor is a *true hernia.*

If an attempt be made for the reduction of the rupture, and it consisted of a piece of intestine, it generally slips up all at once. In its return it makes a kind of guggling noise; and when it is up, the scrotum and process will be found free from any preternatural fulness. If a portion of omentum formed it, it retires more gradually, without any of the noise of the former, and requires to be followed by the finger to the last. If both gut and caul contributed to the formation of it, the gut generally goes up first, and leaves a flabby irregular kind of body behind it, which still possesses the process or scrotum, according as the disease was bubonocele, or oscheocele, and requiring still farther compression, at last ascends.

The intestine said to be most frequently found in a scrotal hernia, is the ileum, though it is also allowed that the cæcum and part of the colon have been met with.

This is one of the many maxims which writer receives from writer, and inattentive readers all believe.

[f] By this remark it may possibly be thought that I mean to say, that the testicle is always to be felt at the bottom of the scrotum in a true hernia; which in general is true, but not without some exceptions. In recent ruptures, of the common kind, whether of the gut or caul, while the hernial sac is thin, has not been long or very much distended, and the scrotum still preserves a regularity of figure, the testicle may almost always be easily felt at the inferior and posterior part of the tumor: but in old ruptures, which have been long down, in which the quantity of contents is large, the sac considerably thickened, and the scrotum of an irregular figure, it often happens that the testicle is not to be felt, neither is it in general easily felt in a *congenial hernia,* for very obvious reasons.

That a portion of the ileum does often descend in a hernial sac is beyond all doubt; but that the descent, or more proper y properly protrusion, of a part of the cæcum and colon is rare, is not true, for it happens very frequently. Perhaps it would not bear to be established as a general rule; but from what has fallen within my observation, in frequently performing the operation for a strangulated rupture, it has appeared to me, that the greater number of those in whom it has become necessary, (all attempts to reduce the parts by hand having proved fruitless,) have consisted of the cæcum with its appendicula, and a portion of the colon. Nor will the size, disposition, and irregular figure of this part of the intestinal canal, appear upon due consideration a very improbable cause of the difficulty or impossibility of reduction by the hand only.

I have already mentioned the principal circumstances by which hernias are distinguishable from other diseases. But it is also to be observed, that the same kind of rupture in different people, and under different circumstances, wears a very various face; the age and constitution of the subject, the date of the disease, its being free or not free from stricture or inflammation, the symptoms which attend it, and the probability or improbability of its being returnable, necessarily producing much variety: the degree of hazard attending this complaint will be also more or less as it shall happen to be circumstanced.

If the subject be an infant, the case is not often attended with much difficulty or hazard; the softness and ductility of their fibres generally rendering the reduction easy as well as the descent; and though from neglect or inattention it may fall down again, yet it is as easily replaced, and seldom produces any mischief: I say seldom, because I have seen an infant, one year old, die of a strangulated hernia, which had not been down two days, with all the symptoms of mortified intestines.

If the patient be adult, and in the vigour of life, the consequences of neglect, or of maltreatment, are more to be feared than at any other time, for reasons too obvious to need relating. The great and principal mischief to be apprehended in an intestinal hernia, is an inflammation of the gut, and an obstruction to the passage of the aliment, and fæces through it; which inflammation

and obstruction are generally produced by a stricture made on the intestine, by the borders of the aperture in the tendon of the abdominal muscle, through which the hernia and its sac pass. Now it must be obvious, that the greater the natural strength of the subject is in general, and the more liable to inflammation, the greater probability there must be of stricture, and the more mischief likely to ensue from it. In very old people, the symptoms do not usually make such rapid progress, both on account of the laxity of their frame, and their more languid circulation; and also that their ruptures are most frequently of ancient date, and the passage considerably dilated: but then, on the other hand, it should also be remembered that they are by no means exempt from inflammatory symptoms; and that if such should come on, the infirmity of old age is no favourable circumstance in the treatment which may become necessary.

If the disease be recent, and the patient young, immediate reduction, and constant care to prevent its pushing out again, are the only means whereby it is possible to obtain a perfect cure.

If the disease be of long standing, has been neglected, or suffered to be frequently down, and has given little or no trouble, the aperture in the abdominal muscle, and the neck of the hernial sac, may both be presumed to be large; which circumstances in general render immediate reduction less necessary and less difficult, and also frustrate all rational expectation of a perfect cure. On the contrary, if the rupture be recent, or though old has generally been kept up, its immediate reduction is more absolutely necessary, as the risk of stricture is greater from the supposed smallness of the aperture, and narrowness of the neck of the sac. If the rupture be very large and ancient, the patient far advanced in life, the intestine not bound by any degree of stricture, but does its office in the scrotum regularly, and no other inconvenience be found to attend it, but what proceeds from its weight, it will in general be better not to attempt reduction, as it will in these circumstances most probably prove fruitless, and the handling of the parts in the attempt may so bruise and injure them as to do mischief: but this must be understood to be spoken, of those only in which there is not the smallest degree of stricture, nor any symp-

tom of the obstruction in the intestine; such circumstances making reduction necessary at all times, and in every case.

With regard to the contents of a hernia, if it be a portion of omentum only, nd has been gradually formed, it seldom occasions any bad symptoms, though its weight will sometimes render it very troublesome. But if it be produced suddenly by effort or violence, that is, if a considerable piece of the caul by accident slip down at once, it will sometimes prove painful, and cause very disagreeable complaints; the connexion between the omentum, stomach, duodenum, &c. being such as to render the sudden descent of a large piece of the first sometimes productive of nausea, vomiting, colic, and all the disagreeable symptoms arising from the derangement of these viscera. When the piece of caul is engaged in such a degree of stricture as to prevent the circulation of blood through it, it will sometimes, by becoming gangrenous, be the occasion of very bad symptoms, and even of death, as I have more than once seen: and thus, as a mere omental hernia, it may sometimes be subject to great hazard. But even though it should never be liable to the just mentioned evil, that is, though the portion of the caul should remain uninjured in the scrotum, yet it renders the patient constantly liable to hazard from another quarter: it makes it every moment possible for a piece of intestine to slip into the same sac, and thereby add to the case all the trouble and all the danger arising from an intestinal rupture. It is by no means an uncommon thing for a piece of gut to be added to a rupture, which had for many years been merely omental, and for that piece to be strangulated, and require immediate help.

An old omental hernia is often rendered not reducible, more by an alteration made in the state of the prolapsed piece of caul, than by its quantity. It is very common for that part of the omentum which passes through the neck of the sac to be compressed into a hard, smooth body, and lose all appearance of caul, while what is below in the scrotum is loose and expanded, and enjoys its natural texture. In this case reduction is often impossible, from the mere figure of the part; and I have so often seen this, both in the living and the dead, that I am satisfied, that for one omental rupture rendered irreducible by adhesions, many more become so from the cause above mentioned.

In the sac of old omental ruptures that have been long down, and only suspended by a bag truss, it is no very uncommon thing to have a pretty considerable quantity of fluid collected: this, in different states and circumstances of the disease, is of different colour and consistence, and seldom so much in quantity as to occasion any particular attention to it; but on the other hand, it sometimes is so much in quantity as to become an additional disease to the original one. I have more than once been obliged to let it out, in order to remove the inconvenience arising from its weight, and the distention of the scrotum, which I have also seen become gangrenous by the neglect of this operation.

If the hernia be of the intestinal kind merely, and the portion of gut be small, the risk is greater, strangulation being more likely to happen in this case, and more productive of mischief, when it has happened: for the smaller the portion of gut is which is engaged, the tighter the tendon binds, and the more hazardous is the consequence. I have seen a fatal gangrene, in a bubonocele, which had not been formed forty-eight hours, and in which the piece of intestine was little more than half an inch. There are few practitioners who have seen business, but know the truth of this; but perhaps the reason of it is not sufficiently explained to the unknowing. It is this: when a considerable portion of intestine passes out from the belly in a hernial sac, it necessarily and unavoidably carries with it a proportional quantity of the mesentery, which every body knows is a strong double membrane. When the prolapsed part is at all considerable, this double membrane is again in some measure folded on itself, and takes off a good deal of the effect of the stricture on the intestine. Now, although this circumstance will not prevent the effect, if the means of relief be totally neglected, yet it will most certainly retard the evil, and give more time for assistance; whereas, when there is little or none of the mesentry got through the tendon, and the thin, tender intestine bears all the force of the stricture, it is immediately brought into hazard.

The practical inference to be drawn from hence is too obvious to need mentioning.

In the intestinal, as in the omental hernia, they which have been often or long down, are in general more easily returned, and do

not require such immediate assistance, as they which have seldom been down, or have recently descended; and in the one kind of hernia as well as the other, the state of the hernial sac with regard to size, thickness, &c. depends very much on the date of the disease, and the regard that has been paid to it.

If the hernia be caused by a portion of the intestine ileum only, it is in general more easily reducible than if a part of the colon has descended with it, which will also require more address and more patience in the attempt. The reduction of a mere intestinal hernia too, *cæteris paribus*, will always remain more practicable than that of a mere omental one, after it has attained to a certain size and state, as the part contained within the former is liable to less alteration of form than that within the latter; which alteration has already been mentioned as no infrequent hinderance of the return of an old caul rupture.

Not that the parts within a mere intestinal hernia are absolutely exempt from such an alteration as may render their return into the belly impracticable, even where there is no stricture: for I have seen that part of the mesentery, which has lain long in the neck of the sac of an old rupture, so considerably hardened and thickened, as to prove an insuperable obstacle to its reduction.

Upon the whole, every thing considered, I think it may be said, that an intestinal rupture, is subject to worse symptoms, and a greater degree of hazard than an omental one, though the latter is by no means so void of either as it is commonly supposed to be; that bad symptoms are more likely to attend a recent rupture than one of ancient date; that the descent of a very small piece of intestine is more hazardous than that of a larger; that the hernia, which consists of gut only, is in general attended with worse circumstances than that which is made up both of gut and caul; and that no true judgment can be formed of any rupture at all unless every circumstance relating to it be taken into consideration.

The cure of a rupture is either perfect, (called also radical,) or imperfect, which is called palliative.

This distinction which is just and true, and founded both on reason and experience, has frequently been misunderstood by the

generality of mankind, and has therefore been the cause of much undeserved censure on the practitioners of surgery.

The truth is, that though the events are extremely different, yet the chirurgi al means which are made use of in either case are exactly the same, *viz.* reduction of the protruded parts, and retention of them when so reduced by proper bandage: these sometimes, and in some circumstances, produce a perfect cure; at other times, and under other circumstances prove only a palliative one; and this uncertainty of events being dependent on causes which a surgeon can neither foresee nor direct, with any tolerable degree of certainty, should warn him against being too forward in making a promise.

To those who are ignorant of the anatomical structure and disposition of the parts concerned in the disease, this assertion has the air of a paradox: they naturally suppose that the means which are or should be made use of to obtain a radical or perfect cure, are or ought to be different from those used toward obtaining only a palliative one; and in this mistake they are confirmed by the bold, though false, assertions of all rupture-quacks.

To labour under a troublesome disorder, perhaps in the most joyous and active part of life, is very disagreeable: to be told that a palliative cure, by the constant use of the truss, is all that can reasonably be expected, gives small comfort, and renders the insinuation, that the regular professors of surgery do not understand the proper treatment of this disease credible, or at least makes it be believed: *quod volumus, facile credimus.* Ignorance of the true nature of the disorder, with a strong desire to be well, on the side of the patient, and bold plausible promises on the side of the pretender, encourage the delusion, till time, and the continuance of the rupture, prove the fraud, which few are found ingenuous enough to own. Whether it proceeds from a false bashfulness, which makes a man be ashamed of acknowledging that he has been imposed upon; from a desire merely to conceal the disorder; from a pleasure arising from seeing others deceived as well as themselves; or from a much worse cause than either of these, I know not: but it happens not very infrequently that the patient, though perfectly undeceived, and convinced of the imposition, concurs in propagating the delusion, and asserts that he has received a cure, which he knows he has not. Of this I could produce many

instances, and some of those among people of such rank, as one would expect should set them above such disingenuousness.

I have already said, that to replace the prolapsed body, or bodies, within the cavity of the belly, and to prevent their falling out again, by means of a proper bandage, is all that the art of surgery is capable of doing in this disease: and what I said was strictly true. But it must also be remembered, that nature, according to the age of the patient, the date of the disease, the kind of rupture, and some other circumstances, is often capable (when properly assisted, and not obstructed) of doing more, and of confirming that as a perfect cure in some, which in others she leaves imperfect, and constantly requiring the assistance of art: for when the portion of gut or caul, or whatever formed the tumor, is perfectly and properly replaced in the belly, and an opportunity thereby given to the aperture in the tendon to contract itself, and for a proper bandage to bring the sides of the entrance of the hernial sac as near together as it will admit, the surgeon has really done his part. What remains is that of nature: and whether she will be capable of so contracting the part, as to prevent a future descent or not, is matter of great uncertainty: it is a circumstance which art has very little power of assisting, and which can be known only from the event.

On the contrary, all the pretensions which have at different times been made to remedies, indued with the capacity of healing and consolidating the parts supposed to be broken or torn, or of constringing such as are dilated, have all proved inefficacious and delusive, to say the best of them: the parts concerned in this disease, and which ought to be affected by the operation of such remedies, are absolutely out of the reach of any applications or medicines whatever: the relief which some people have found while under such processes, has been from the long rest which they have been subjected to, or from the strict bandage which has been put upon them: either of which will, in some cases, do a great deal; while the remedies which are either applied or taken, are made use of merely to deceive, and never had, or can have, any share in the real cure of a rupture.

By what has been said, I must beg not to be understood to mean, that when the gut or caul have been once replaced, the

patient can receive no farther benefit from chirurgical assistance; nor that every rupture in persons of mature age is incapable of perfect cure: this is far from my meaning, and far from truth. There are many circumstances attending ruptures, which will require frequent assistance in order to render a cure more probable; and there are many ruptures in persons of mature age, which will admit of perfect cure, if properly and judiciously managed from the first.

I only mean to contradict that positive assertion which all rupture-quacks make use of, and which too many of mankind believe, *viz.* that there are medicines and applications which are specific in the cure of this disease, and that they (such quacks) are possessed of them; both which are absolutely false.

As this is a matter of some importance to mankind, and may possibly be rendered still more intelligible by a few words, I beg leave to be indulged in them.

The general doctrine is, that the ruptures of infants, and of very young children, frequently admit of a perfect cure; those of adults less frequently; and those of old people seldom or never; all which, with certain limitations, is true.

The great and material difference between these consists in the state of the hernial sac, and that of the aperture in the abdominal tendon through which it passes.

The sac of a hernia has already been described as being an elongation or process of the peritoneum, or general lining of the cavity of the belly, thrust down before the body constituting the swelling; which body is enveloped in it as in a bag, somewhat resembling what is vulgarly called a thumb-stall, or the finger of a glove cut off. While the hernia is recent, this bag is thin and fine, like the rest of the membrane of which it is a portion; and being of a very dilatable nature, is easily enlarged, according to the quantity of contents which insinuate themselves into it: like some other parts of the body, it increases in thickness and toughness as it increases in capacity; and as it seldom if ever returns back into the belly, after it has once passed out from it, it is by the repeated descents of a portion of gut or caul into it, gradually enlarged in size, and consequently in thickness; insomuch, that in old ruptures that have been neglected, or deemed irreducible,

or been suffered to remain long, or always down, it generally acquires a very considerable degree of toughness, thickness, and hardness. In those ruptures which are not of the congenial kind, at first it gets no lower than the groin, and while it remains there is generally small and thin; but by frequent protrusions of the intestine or omentum, it is pushed by degrees into the scrotum, and then most frequently acquires a pyriform kind of figure, having its broader part in the scrotum, and its narrow one, or neck, in the groin.

In infants, in very young subjects, and in recent cases, this sac, from its soft thin state, is capable of having its upper part or neck so compressed by means of a bandage, as either to procure an union of the sides with each other, or at least so to lessen the diameter of its passage as to prevent the descent of any thing into it from the belly: this produces what is commonly called a perfect cure.

In those of mature age, or whose ruptures are of some standing, the entrance into the sac is generally large, in proportion to the size and age of the patient, and thicker and firmer than in the former state, for reasons just given: in these, therefore, the closing or compression of its neck, enough to hinder the falling down of any thing from the abdomen, is more difficult to accomplish, and more unlikely to succeed. In very ancient people, or very old ruptures, success is still more improbable, for the same reasons.

A bandage therefore, or truss, though it is the only remedy at all ages, and in all states of reducible ruptures, yet acts in a different manner, and is capable of producing very different effects, according to the circumstances of the cases in which it is applied: in very young persons a radical cure is frequently the consequence; in the middle aged it often gives the tendon and mouth of the sac such opportunity of being contracted, as to produce nearly the same event; but as it only serves by the mere pressure of the pad to keep the parts in their proper place, in very old people it can hardly ever be laid aside, without hazard of a new descent, which, while it is worn properly, it will almost always prevent.

From the foregoing short account, the following facts may, I think, be collected:—

1. That the principal circumstances attending a rupture must be subject to great variety, according to the age and constitution of the patient, the date of the disease, &c. and consequently that the precise case, and age, in which a radical or perfect cure is obtainable or not, is not easy to be determined, though a judicious man will most commonly know when it is very improbable.

2. That recent ruptures, if immediately and properly taken care of, are capable of a perfect cure at almost any age.

3. That though the thickness of the hernial sac, and the largeness of the abdominal aperture, are generally mentioned as the two causes why old ruptures do not admit of a cure, yet in fact the latter is only a consequence of the former.

4. That all external applications in the attempt toward the cure of a rupture, must, if they are used with any design at all, be intended either to constringe the aperture through which the parts have descended, or to lessen or contract the diameter of the neck of the hernial sac.

5. That the construction of the tendinous aperture (supposing such medicines could penetrate to it) is impossible while it continues dilated, by an old, thick, tough hernial sac, which sac, from the connections it always has with the cellular membrane of the spermatic chord, can never be returned into the belly; and therefore,

6. That such medicines can be serviceable no other way than by rendering that sac again thin, fine, and compressible; which, from the nature of things, and from all experience, is absolutely impracticable.

SECT. II.

The different treatment which ruptures may require, being dependent on different circumstances attending the disease, I shall, for the better information of the inexperienced reader, divide them into four classes; under which, I think, may be comprehended not only all the kinds of hernias, but every particularity also with which they may happen to be distinguished.

1. Under the first, I reckon those which are capable of easy and immediate reduction, and are not attended by any troublesome or bad symptoms.

2. Under the second, those which have been so long down, that the contained parts are either so altered in form, or have contracted such adhesions and connexions, as to be absolutely incapable of being reduced at all.

3. Under the third, I comprehend those in which such stricture has been made on the protruded parts, as to bring on pain, and produce such an obstruction in the intestinal canal, as to render immediate reduction necessary, but at the same time difficult.

4. And under the fourth, I shall place those in which the return of the parts by the mere hand is absolutely impracticable, and in which the patient's life can be saved only by a chirurgical operation.

The first is very frequently met with in infants, and sometimes in adults, and is too often neglected in both. In the former, as the descent seldom happens but when the infant strains to cry, and the gut is either easily put up, or returns *suâ sponte*, as soon as the child becomes quiet; it often is either totally unattended to, or an attempt made to restrain it only by a bandage made of cloth or dimity, and which, being ineffectual for such purpose, lays the foundation for future trouble and mischief.

This is in great measure owing to a common opinion, that a young infant cannot wear a steel truss: a generally prevailing error, and which ought to be corrected. There is no age at which such truss may not be worn, or ought not to be applied; it is, when well made, and properly put on, not only perfectly safe and easy, but the only kind of bandage that can be depended upon; and as a radical cure depends greatly on the thinness of the hernial sac, and its being capable of being so compressed as possibly to unite, and thereby entirely close the passage from the belly, it must therefore appear to every one who will give himself the trouble of thinking on the subject, that the fewer times the parts have made a descent, and the smaller and finer the elongation of the peritoneum is, the greater the probability of such cure must be.

The same method of acting must for the same reasons be good in every age in which a radical cure may reasonably be expected;

that is, the prolapsed parts cannot be too soon returned, nor too carefully prevented from falling down again, every new descent rendering a cure both more distant and more uncertain.

As soon as the parts are returned, the truss should be immediately put on, and worn without remission, care being taken, especially if the patient be an infant, to keep the parts on which it presses constantly washed, to prevent galling.[g]

It can hardly be necessary to say that the surgeon should be careful to see that the truss fits, as his success and reputation depend on such care. A truss which does not press enough is worse than none at all, as it occasions loss of time, and deceives the patient or his friends; and one which presses too much, or on an improper part, gives pain and trouble, by producing an inflammation and swelling of the spermatic chord, and sometimes of the testicle.

In adults, whose ruptures are of long standing, and accustomed to frequent descent, the hernial sac is generally firm and thick, and the aperture in the tendon of the abdominal muscle large; the freedom and ease with which the parts return into the belly, when the patient is in a supine posture, and the little pain which attends a rupture of this kind, often render the persons who labour under it careless: but all such should be informed, that they are in constant danger of such alteration in their complaint, as may put them into great hazard, and perhaps destroy them. The passage from the belly being open, the quantity of intestine in the

[g] As the constant and unremitted wearing a truss to some people is irksome and inconvenient, it may not be improper to remark that Mr. Pott did not intend by the expression "*worn without remission*," that the truss is always to be worn, by night as well as by day; he generally allowed it to be taken off when in bed, as a recumbent posture, in most cases, is sufficient security against the reprotrusion of the intestine or omentum; but the truss should be carefully re-applied in the morning, while the person is in the same horizontal position, and either he, or she, should be particularly observant to put it on when under the necessity of going to stool in the night. If the patient be subject to fits of coughing, common sense dictates that at those times it ought not to be laid aside. Children are so subject to violent exertions from crying and other causes, that their trusses cannot often be safely left off; but when they are well and quiet, and in bed, the pressure may now and then be judiciously dispensed with; and the removal of it, though but for short intervals, affords them great ease and relief. E.

hernial sac is always liable to be increased, and, when down, to be bound by a stricture. An inflammation of that portion of the gut which is down, or such obstruction in it as may distend and enlarge it, may at all times produce such complaints as may put the life of the patient into imminent danger; and therefore, notwithstanding this kind of hernia may have been borne for a great length of time, without having proved either troublesome or hazardous, yet, as it is always possible to become so, and that very suddenly, it can never be prudent or safe to neglect it.

Even though the rupture should be of the omental kind, (which considered abstractedly is not subject to that degree or kind of danger to which the intestinal is liable,) yet it may be secondarily, or by accident, the cause of all the same mischief; for while it keeps the mouth of the hernial sac open, it renders the descent of a piece of the intestine always possible, and consequently always likely to produce the mischief which may proceed from thence.

They who labour under a hernia thus circumstanced, that is, whose ruptures have been generally down while they have been in an erect posture, and which have either gone up of themselves, or have been easily put up in a supine one, should be particularly careful to have their truss well made, and properly fitted; for the mouth of the sac, and the opening in the tendon, being both large and lax, and the parts having been used to descend through them, if the pad of the truss be not placed right, and there be not a due degree of elasticity in the spring, a piece of intestine will, in some posture, slip down behind it, and render the truss productive of that very kind of mischief which it ought to prevent.

It is scarcely credible how very small an opening will serve for a portion of gut or caul to insinuate themselves into at some times. Now, though in persons of mature age it most frequently proves impracticable so to compress the mouth of the hernial sac, as absolutely to close it, yet, by the constant use of a well-made truss, it may be so lessened, as to render the descent of a piece of intestine into it much more difficult: from whence we may learn the great consequence of having the part completely reduced before the truss is applied, and the danger that may be incurred by laying such bandage aside after it has been worn some time; since the same alteration which renders the descent of the gut less easy,

will also make the reduction more difficult, if a piece should happen to get down: and hence also we may learn why the bandage should be long and unremittingly worn by all those whose time of life makes the expectations of a perfect cure reasonable, many of the ruptures of adults being owing to the negligent manner in which children at school are suffered to wear their trusses.

I know a gentleman who has for some years had an omental rupture, which was neglected while he was young, and he having naturally a lax habit, and the abdominal opening being much dilated, he finds it extremely difficult to keep it up, even with the best truss he can get, behind which it will sometimes slip down: when this happens, it gives him such immediate and acute pain at his stomach, and makes him so intolerably sick, that he is obliged immediately to throw himself on his back, and procure the return of the piece of omentum.

SECT. III.

In the second class I ranked those cases in which the parts constituting the hernia are found irreducible, but not in a state of inflammation, nor producing any troublesome or dangerous kind of symptoms.

This incapacity of reduction may be owing to several causes, but most frequently arises either from the largeness of the quantity of the contents, from an alteration made in their form and texture, or from connexions and adhesions which they have contracted with each other, or with their containing bag.

I have already mentioned it as my opinion that ruptures are sometimes rendered difficult to be reduced, by that portion of the intestinal canal which is called the cæcum, or the beginning of the colon, being contained in the hernial sac. Of which fact I am as much convinced as the nature of such kind of things will

permit; that is, by observations made both on the living and the dead.

When a hernia of this kind (*viz.* one containing such a part of the intestinal tube) has been long neglected, and suffered to remain in the scrotum without any bandage at all to support its weight, the hernial sac, being constantly dragged down, and kept in a state of distention, necessarily becomes thick, hard, and tough: by this means the diameter of its neck is lessened, and the return of the intestine back from the scrotum into the belly rendered more and more difficult, as the parts through which it is to pass become harder, and less capable of yielding. This will, indeed, in time prove an obstruction sufficient to hinder any part of the intestine, or even of the omentum, from being returned: but the more the difficulty is, which proceeds from the mere figure and size of the portion of gut, the greater will be the obstruction when added to that arising from the just mentioned cause.

An alteration produced by time, and constant, though gentle, pressure in the form and consistence, or texture of the omentum, is also no infrequent cause, why neglected omental ruptures become irreducible.

The cellular membrane in all parts of the body, however loose and light its natural texture may be, is capable of becoming hard, firm, and compact, by constant pressure. Of this there are so many, and so well-known instances, that it is quite unnecessary to produce any.

The omentum, from its texture, is liable to the same consequence. When a portion of it has been suffered to remain for a great length of time in the scrotum, without having ever been returned into the belly, it often happens, that, although that part of it which is in the lower part of the hernial preserves its natural soft, adipose, expansile state, yet all that part which passes through what is called the neck of the sac, is, by constant pressure, formed into a hard, firm, incompressible, carnous kind of body, incapable of being expanded, and taking the form of the passage in which it is confined; exactly filling that passage, and rendering it impossible to push up the loose part which fills the scrotum.

This is no theoretic opinion, but a fact which I have seen and proved often; and whoever will reflect on it, will immediately find in it one insuperable objection to the return of some old omental ruptures.

The same reason for incapacity of reduction is also sometimes met with in ruptures of the intestinal kind, from an alteration produced on that part of the mesentery which has been suffered to lie quiet for a great length of time in the neck of an old hernial sac.

The other impediment, which I mentioned, to the return of old ruptures, is connexion and adhesion of the parts, either with each other, or with the bag containing them. This is common to both the intestinal and omental hernia, and is produced by slight inflammations of the parts, which have been permitted to lie long in contact with each other, or perhaps in many cases from the mere contact only. These adhesions are more or less firm in different cases, but even the slightest will almost always be found an invincible objection to the reduction of the adherent parts, by the hand only.

Many, or perhaps most of these irreducible ruptures become so by mere time and neglect, and might at first have been returned: but when they are got into this state, they are capable of no relief from surgery but the application of a suspensory bag, to take off or lessen the [h] inconvenience arising from the weight of the scrotum.

People in this situation should be particularly careful not to make any attempts beyond their strength, nor aim at feats of agility: they should take care to suspend the loaded scrotum, and to keep it out of the way of all harm from pressure, bruise, &c. When the tumor is very large, a soft quilted bolster should be

[h] I am not unaware that most of these are capable of being cured by the operation for the bubonocele, as it is called; but as I should never think of proposing it in any case in which there are not symptoms that threaten the life of the patient, so I have not mentioned it in this place as a means of cure. I also am not unapprised what influence a successful operation or two of this sort has had on the unknowing: but I also know that such accidental successes have emboldened the same operators to commit more than one or two murders, in similar cases; and that, from the prevalence of fashion, some of these rupture-doctors have been largely rewarded, when they ought to have been hanged.

worn at the bottom of the suspensory to prevent excoriation, and the scrotum should be frequently washed for the same reason; a loss of skin in this part, and in such circumstances, being sometimes of the utmost importance. They ought also to be particularly attentive to the office of the intestinal canal, to see that they do not by any irregularity of diet disorder it, and keep themselves from being costive, for reasons too obvious to need relating. By these means, and with these cautions, many people have passed their lives for many years free from disease or complaint, with very large irreducible ruptures.

On the other hand, it is fit that mankind should be apprised that the quiet, inoffensive state of this kind of hernia is by no means to be depended upon; many things may happen to it, by which it may be so altered, as to become hazardous, and even fatal: an inflammation of that part of the gut which is down, any obstruction to the passage of the aliment or fæces through it, a stricture made by the abdominal tendon, either on what has been long down, or on a new portion which may at any time be added to it, are always capable of so altering the state of the case, as to put the life of the patient into danger.

Indeed, the hazard arising from a stricture made on a piece of intestine contained in the sac of an old irreducible hernia, is in one respect greater than that attending one that has been found at times reducible; since from the nature of the case it will hardly admit of any attempt toward relief but the operation, and that in these circumstances must necessarily be accompanied with additional difficulty.[i]

[i] I was some time ago desired to be present at the opening of a dead body of a man who had for many years laboured under a large irreducible hernia, but which had never given him any trouble than what proceeded from its weight, and who died very old: my then state of health would not permit me to go, but I desired leave to send a very ingenious young gentleman, Mr. Price, who was then my pupil at St. Bartholomew's, and is now settled in Wales. The following is the account he gave me:—

"The hernia was of fourteen years standing, during which time no attempt "had ever been made for its reduction; it was on the right side, and dis- "tended the scrotum to such a size, that it measured, from the opening in "the abdominal muscle to the bottom of the tumor, fourteen inches and an "half, and round the tumor twenty-two inches; the ring as it is called, was very "large, and had no appearance of stricture; the sac was not so thick as might "have been expected, and contained no water; the jejunum ileum, the sac

Among the ruptures which have been thought not reducible, and treated as such, there have been some, which, upon more judicious and more patient attempts, have been found capable of reduction.

When this is suspected to be the case, the proper method is by absolute rest, in a supine posture, for a considerable length of time, by great abstinence, and the use of evacuants, so to lessen the size of the parts in the hernial sac as to render them capable of passing back again into the belly.

This method has now and then succeeded, and in some cases is worth the trying; but previous to the attempt, there should be some circumstances which makes success probable; and there should also be good reason to believe, that the habit and age of the patient will bear the necessary confinement and evacuation; otherwise, even though he should get rid of his rupture, he may be much worsted by the experiment.[k]

If such attempt succeeds, a truss should be immediately put on, and worn constantly, without remission; for in these people, the largeness of the abdominal aperture, the thickness of the hernial sac, and the relaxation of the mesentery, make a new descent always to be apprehended and guarded against.

An omental rupture which has been so long in the scrotum as to have become irreducible, is very seldom attended[l] with any bad symptoms, considered abstractedly: but, as I have already said, it is constantly capable of being the occasion of an intestinal hernia, and all its consequences; neither is that all, for the omen-

"of the colon, called the cæcum, with its appendicula vermiformis, together "with a large portion of omentum, were the contents; the duodenum was so "displaced by the weight of the rest of the guts within the sac, that its direc-"tion from the pylorus was perpendicular; the caul adhered to the hernial "sac in several places, the intestine in none; the testicle, included in its tu-"nica vaginalis, was much wasted; the spermatic artery and vein ran down "behind the hernial sac, but the vas deferens ran up on the inner and left "side of it, at a great distance from them, through the whole of its course; "but nevertheless would not have been in the way of the operation had it "been necessary."

k Hildanus gives an account of a man radically cured by six months' confinement to bed, in the case of a rupture of twenty years date.

l Garengeot relates the case of an epiplocele producing very bad symptoms; and so does Dionis.

tum, either so altered in form and texture, or so connected as to be incapable of reduction, may by accident inflame, and either become gangrenous or suppurate, and be the occasion of a great deal of trouble. Of this I have seen two or three instances, one of which I will relate.

I was desired to see a gentleman, from whose scrotum near a pint of brown, sanius, fœted fluid had been discharged two or three days before. The account he gave of himself was as follows: That he had been from his youth subject to the descent of a soft, flabby body into the scrotum, when he was in an erect posture, but which for many years he could put up when he pleased, and which always went up when he lay down; that having no trouble from it, and being naturally shy and bashful, he had done nothing to it, nor showed it to any one; that from the sudden spring of an unruly horse, he had struck it with great violence against the pummel of his saddle, which had given him immediate pain; that the next day it swelled still more, and became more painful, but that being afraid, or ashamed, he still concealed it, and only anointed it with something greasy, till at last he could bear it no longer: the person to whom he showed it took it for a hydrocele, tapped it, and let out the fluid just mentioned; and on the fifth or sixth day from this operation I saw it.

The whole scrotum was much inflamed, and the orifice made by the trocar foul and sloughy: he had a degree of heat and fever upon him, which forbad any operation at that time; and therefore I desired that he might be dressed soft and easy, have an emollient cataplasm applied to the whole scrotum, lose some blood, and have a clyster.

By proper care the tumor subsided, his fever left him, and the slough casting off largely brought the putrid omentum within view; upon sight of which I would have laid the whole open, but was not permitted. I enlarged the orifice a little, and in so doing cut through an old hernial sac, which was very thick and hard; what part of the omentum was loose I brought away with a pair of forceps; but the separation of the whole took up much time, and the hard hernial sac caused so many abscesses, and occasioned so large a discharge, that, being a valetudinarian, he had certainly sunk under it, had it not been for the free use of the bark.

If, instead of this method of treating it, I had been permitted to have laid it open through the whole of its length, removed the rotten omentum, and cut off some part of the sides of the hernial sac, the cure would have been shortened, and the scrotum, would have been left in a much better state.

That an omental rupture, which has so long resisted all attempts for reduction, as to create a belief of its being absolutely irreducible, may now and then, by long rest and abstinence, become capable of being returned, I am under no doubt, for reasons which have already been mentioned: and not long ago, I had myself a patient in St. Bartholomew's hospital, who underwent the operation for a radical cure of a hydrocele, who had also an omental hernia, which I and some others had often tried ineffectually to reduce: this, during the time of his confinement to bed after the operation, went up of its own accord, and was ever afterwards kept there by a truss.

It sometimes happens in old compound ruptures, that the piece of intestine is reducible, and that of the omentum is not; in which case we are told, that the portion of intestine should be kept up by a truss, whose pad may be so made, as not to press on the omentum while it restrains the intestine.

I will not deny that this may now and then be practicable, but it is not often so, and it ought to be particularly attended to, and very carefully watched, lest a small piece of gut slip down, and, being pressed on by the truss, produce fatal mischief.

I have seen an omental rupture, in which the piece included in the sac had the knotty hardness, the pain, and every other symptom of a cancer.

SECT. IV.

Under the third division I reckon those ruptures which are reducible, but whose reduction is difficult, and which are attended with pain and trouble and hazard.

Difficulty of reduction may be owing to several causes. The size of the piece of omentum, or the inflamed state of it; the quan-

tity of intestine and mesentery; an inflammation of the gut or its distention by fæces or wind; or the smallness of the aperture of the tendon through which the hernia passes. But to whatever cause it be owing, if the prolapsed body cannot be immediately replaced, and the patient suffers pain, or is prevented thereby from going to stool, it is called an incarcerated hernia, a strangulated hernia, or a hernia with stricture.

The symptoms are a swelling in the groin or scrotum, resisting the impression of the fingers: if the hernia be of the intestinal kind, it is generally painful to the touch, and the pain is increased by coughing, sneezing, or standing upright. These are the very first symptoms; and if they are not relieved, are soon followed by others, *viz.* a sickness at the stomach, a frequent reaching or inclination to vomit, a stoppage of all discharge per anum, attended with a frequent hard pulse, and some degree of fever.

A patient in these circumstances may be looked upon as in some danger, and requiring immediate assistance. A stricture made on the prolapsed part of the gut, by the borders of the natural aperture in the tendon of the oblique muscle, is the immediate cause of these symptoms, which nothing can appease or remove, except what will take off that stricture. This can be accomplished only by removing the part so bound from the tendinous opening; that is, by returning it back into the belly whence it came; or by dividing a part of the tendon itself: the former of these, when it can be practised, is always most eligible, and makes our present subject.

I have already observed, that a portion of intestine, while it is neither bound by any degree of stricture, nor affected by inflammation, will remain quiet in a hernial sac in the scrotum, and perform its proper office freely and perfectly; but the instant either of the above-mentioned accidents (particularly the former) happens, the case is altered; the passage both of the aliment and fæces is stopped or interrupted; the peristaltic motion of the whole canal is disturbed or perverted; and the circulation of the blood, through the straitened portion of intestine, is so impeded, that if the obstruction is not removed in time, a mortification must follow.

Every symptom which attends an incarcerated rupture depends

on this cause, and is justly accountable for from it. The tumor, the pain, the tension of the belly, the nausea, the vomiting, and the suppression of stools, are so many effects produced by it, and removeable only by removing it.

My present consideration being those ruptures which are capable of being returned, I am now to speak of the manner of attempting such reduction.

The patient should be laid in a supine posture, with his trunk certainly as low, if not lower, than his thighs; the thigh on the diseased side should be so elevated, as to contribute as much as possible to the relaxation of the abdominal aperture; and then the surgeon grasping the lower part of the tumor gently with his hand, in such a manner as to keep the testicle from ascending, and the intestine from descending, must endeavour to procure the return of the latter through the ring, as it is vulgarly called, by gentle continued pressure toward that opening. If the case be a bubonocele, there will be no occasion for endeavouring to grasp the tumor, but by continued, moderate pressure on it with the fingers, to endeavour the return of the piece of gut.

This may serve for a general description of the method of performing this operation; but the exact manner of executing it is one of those manœuvres which can be learnt only by observation and practice, and of which no verbal description can convey an adequate and perfect idea: knowledge of the structure and situation of the parts, will instruct any one how to go about it, and a little practice will soon make him adroit.

The posture of the body and the disposition of the lower limbs may be made very assistant in this operation, when the difficulty is considerable; the nearer the posture approaches to what is commonly called standing on the head, the better, as it causes the whole packet of small intestines to hang, as it were, by the strangulated portion, and may thereby disengage it. A little time and pains spent in this manner will frequently be attended with success, and obtain a return of the part; but if it should not, and the handling of it (which I must repeat should always be gentle) becomes painful, and very fatiguing to the patient, we are advised to desist a few hours, and try the effect of other means.

These means are phlebotomy, clysters, cathartics, the application of cataplasms, fomentations, embrocations, &c.

Children, especially very young ones, bear the loss of blood very ill, and are very apt to swoon, if the quantity be at all considerable; if, therefore such accident happens, the surgeon should embrace the opportunity which such general relaxation will afford him of reducing the rupture, especially as it gives him another advantage, by preventing the child from crying, and making resistance.

Perhaps there is no disease affecting the human body in which bleeding is found more eminently and immediately serviceable than in this, and which therefore, if there are no particular circumstances in the constitution prohibiting it, ought never to be omitted; but, on the contrary, should be freely and largely repeated, if it appears at all necessary.

A semicupium, or warm bath, will, by the general relaxation which it necessarily produces, be found frequently serviceable.

The use of warm fomentations, soft cataplasms, and relaxing oily embrocations, are also advised with a view to relax the tendon of the abdominal muscle, and to render the return of the parts contained in the hernial sac easy; but I am afraid that such kind of applications have in general been the occasion of much more mischief than good. The effect of them can hardly reach beyond the skin and membrana cellularis, and may possibly, by relaxing them, take off some small part of the pain which arises from their distention, but will seldom have any effect on the immediate seat of the disease, the tendon of the oblique muscle; the enlargement or relaxation of which only can be of material service.

I know that in this I differ from the majority both of writers and practitioners, but having (as I think) truth on my side, I do again venture to say, that I verily believe, that the confidence which has been placed in such kind of applications has destroyed many more lives than it has saved. A hernia, with painful stricture, and stoppage of stools, is one of those cases in which we can seldom stand still, even for a short space of time; if we do not get forward, we generally go backward; and whatever does no good, if it be at all depended upon, certainly does harm, by

occasioning an irretrievable loss of time: of this kind I take the cataplasm and embrocation[m] to be. While the former is applied, or the latter used, no other more powerful means are made use of; and though it has the appearance of doing something, yet I fear it is little more than specious trifling; especially if the case be at all pressing.

Very different have been the opinions of different people concerning the use of cathartic medicines; some advising them strenuously, others placing no dependence on them at all. As different also have been the opinions of those who do advise them, with regard to the kind of medicine proper on this occasion; some prescribing those of the lenient kind, such as Glauber's salt, infusum sennæ, &c. others the more powerful or ponderous kind of remedies, such as Extract. Cathart. Jallap, Mercurius dulcis,[n] &c.

I believe I may venture to say that I have tried them all, but I cannot say that I have such faith in any of them as to think very highly of them. With regard to the former, *viz.* the lenient sort of purges, it is not often that a patient in these circumstances can keep them upon his stomach; and even when they are not rejected by vomit, they very seldom have force sufficient to answer the end proposed. The more stimulating ones are certainly better calculated to excite the peristaltic motion of the intestines, (the one thing to be aimed at,) and thereby free the confined piece; but on the other hand, if they do not succeed, they add to the fulness and tension of the belly, as well as to the heat and thirst.

I would by no means be understood to mean that I am absolutely against the use of cathartic medicines; I only mean to signify, that I have no great dependence on them, and that I think

[m] In a very pompous modern book may be seen an operose, expensive process, for making an ointment of a solution of gold, pearl, &c. to be used for assisting the reduction of strangulated intestines, and which, when properly made, may possibly be as useful as pomatum, ointment of elder, or any other greasy application.

[n] The ingenious and learned Dr. Monro of Edinburgh, says, that he has more than once reduced a rupture of this kind by a smart dose of jallap and mercurius dulcis, when other methods have failed. The same gentleman says, he has seen the external application of cold claret, or snow, instead of a warm poultice, used with good success.

persisting in the ineffectual use of them often adds unnecessarily to the suffering of the patient.

But though I cannot say that I have seen frequent benefit from the exhibition of carthartics by the mouth, yet I have often experienced the good arising from acrid, stimulating clysters, and suppositories frequently repeated; particularly from the smoke of tobacco* and from a composition of salt, honey, and aloes, boiled to the proper consistence of a suppository. By these I have seen very alarming ruptures returned, when they have been thought capable of being relieved by nothing but the chirurgical operation.

There is another method of endeavouring to obtain relief in this case, which has been proposed by few, and I hope practised by fewer (though I have seen two patients, upon whom it had been tried, and who were both destroyed by it): it is the making several punctures with a round needle through the tumid scrotum into the gut, in order (as it is said) to let out the air which is supposed to distend the latter, and prevent its return. If this practice was worth a serious refutation, many arguments, drawn from the nature both of the parts and of the disease, might be produced against it: but it is really too absurd to waste either my own or the reader's time about it.

There is no circumstance attending ruptures with stricture, in which more variety is found, than in the time which they will safely admit to be spent in their reduction: some have been successfully replaced at the end of eight or ten days, others have proved fatal in one. This difference may proceed from difference of constitution and habit, or from some particular circumstance in the disease itself; but let the cause of it be what it may, as it never can be absolutely foreseen, it should never be trusted; the sooner a rupture is reduced, the sooner the patient is out of danger from the stricture, and the sooner will he be rid of those symptoms, which it has already occasioned.

Recent hernias are in general more liable to stricture than old

* I cannot help thinking that the present machine, which is used for the tobacco clyster, might be considerably improved, that is, might be made to throw in the fume in much greater quantity, and with more certainty. A pump is now made for this purpose, which I have used very successfully.

ones; for reasons which are obvious from what has already been said: but when old ones get into the same circumstances, the symptoms are much the same; though I think in general they are not altogether so pressing, and the latter generally admit of more time to attempt reduction in. The smaller the portion of intestine which is engaged, the greater the pain is, and the more hastily do the symptoms advance. I have seen a bubonocele in a young woman prove fatal in less than a day, which had never been down before, and in which the portion of intestine was so small, as hardly to engage its whole canal.

Omental ruptures in general are not subject to bad symptoms arising from stricture; though they will sometimes be painful and troublesome, from the connexion of the caul with the viscera, as I have often seen. As this is an accident which they are all liable to, they should never be suffered to remain down, if they are reducible; and that not only on this account, but also because they render the patient always liable to the descent of a piece of gut. In general they are more easy of reduction than the intestinal, and being not painful will admit of more free handling, as well as more time to be spent in the attempt.[p]

I have already mentioned the reasons why an omental rupture is sometimes incapable of being reduced, *viz.* adhesion to the sides of the hernial sac, or such an alteration in the form of it, as makes it impossible for it to passs through the abdominal aperture. When this is truly the case, as is most reasonable to suppose when it resists all proper attempts, there is no remedy but to suspend the weight of it in a bag-truss, and thereby render it as little troublesome as possible. This is indeed all that can be done when the rupture is absolutely irreducible; but in books will be found directions to leave an old omental hernia down, and suspend it in a bag, even though it should be reducible, rather than return it into the belly, lest it should lie there in a lump, and make the patient uneasy. This is one of those maxims which writers receive from each other, and deliver down to posterity,

[p] Writers of good credit have given accounts of the worst symptoms from a mere epiplocele; in Dionis may be seen a case of this kind, in Garengeot, and others.

without inquiring into their propriety. It may in some few particular cases be right to do so, but cannot be admitted as a general rule: surely it must always be worth while to try how it will be when it is up, rather than be content with a method, which is hardly palliative, and which always may be productive of new evil.

When the parts are fairly reduced, the next consideration is, how to keep them from falling down again: this can only be done by a bandage, the pad of which must make a constant pressure against the opening in the abdominal tendon, and thereby not only keep the gut or caul from pushing out, but make the sides of the hernial sac approach each other as near as possible.

In the making and adjusting this kind of bandage, some ingenuity is necessary: if it be not so made, and so put on, as to do good, it will do harm: if it does not keep the intestine up, the patient is much more liable to mischief with it than without it; and it has often, by pressing on the rupture while down, proved very pernicious, in cases where there has been no degree of stricture from the tendon. It therefore behoves every surgeon to see that the truss which he orders is well made and properly applied, lest all his pains should be baffled by the bad make, or injudicious application of this piece of machinery.

If the symptoms of pain, inflammation, &c. ran high before the parts were reduced, they will not always cease immediately after; and as the symptoms which remain after the gut is returned, do in all probability proceed from its having been inflamed by the stricture, such remedies as are proper in that case ought to be made use of; the body should be kept open, and the diet and regimen should be low and sparing, while the least degree of tension or pain remain; in short, till all complaint is absolutely removed from the abdomen, and the intestines do their office freely, and without trouble.

SECT. V.

I AM now come to the fourth division, under which I comprehended all those ruptures, which are in such a state as to be irreducible by the mere hand, and in which a chirurgical operation is necessary for the preservation of the life of the patient.

Impracticability of reduction may be owing to many causes, most of which have already been recited; such are, alteration of the form of the parts contained in the hernial sac, largeness of their quantity, adhesions either to the sac, or to each other, or both, and a stricture made on the intestine, by the borders of the aperture in the abdominal tendon: these are each of them causes why ruptures are sometimes incapable of being returned back into the belly, and will require our consideration in their proper places; but in this it is my intention to speak only of the last, it being that which calls most immediately for relief, which most frequently requires the surgeon's knife.

Whether the primary and original cause of the mischief arising from this stricture, be in the contained, or in the containing parts of a rupture, I will not now stay to inquire; nor whether the stricture made by the tendon be a cause, or an effect; but shall consider the intestine as so engaged in it, as to be rendered incapable of being returned into the cavity of the belly, (by the hand only,) and suffering in such manner, by being so bound, as to produce a series of bad symptoms, and at last (if not relieved) death.

This stricture, which according to its different degrees renders the reduction of an intestinal hernia either difficult or impossible, is according to such degrees productive of what are called the symptoms of a strangulated rupture, and which are more or less pressing, as they more or less interest the life of the patient.

The earliest of these symptoms were related in the former section, as attendant on those ruptures which were reducible, though with difficulty, *viz.* tumor in the groin or scrotum, attended with pain, not only in the part, but all over the belly, and creating a sickness and inclination to vomit, suppression of stools, and some

degree of fever: these are the first symptoms, and if they are not appeased by the return of the intestine, that is, if the attempts made for this purpose do not succeed, they are soon exasperated; the sickness becomes more troublesome, the vomiting more frequent, the pain more intense, the tension of the belly greater, the fever higher, and a general restlessness comes on, which is very terrible to bear. When this is the state of the patient, no time is to be lost: a very little delay is now of the utmost consequence; and if the single remedy which the disease is now capable of be not administered immediately, it will generally baffle every other attempt. This remedy is the operation, whereby the parts engaged in the stricture may be set free. If this be not now performed, the vomiting is soon exchanged for a convulsive hiccough, and a frequent gulping up of bilious matter; the tension of the belly, the restlessness, and fever, having been considerably increased for a few hours, the patient suddenly becomes perfectly easy, the belly subsides, the pulse from having been hard, full, and frequent, becomes low, languid, and generally interrupted; and the skin, especially that of the limbs, cold and moist; the eyes have now a languor and a glassiness, and a lack-lustre not easy to be described; the tumor of the part disappears and the skin covering it sometimes changes its natural colour for a livid hue; but whether it keeps or loses its colour, it has an emphysematous feel, a crepitus to the touch, which will easily be conceived by all who have attended to it, but an idea of it is not so easy to be conveyed by words: this crepitus is the too sure indicator of gangrenous mischief within. In this state, the gut either goes up spontaneously, or is returned with the smallest degree of pressure; a discharge is made by stool, and the patient is generally much pleased at the ease he finds: but this pleasure is of short duration, for the hiccough and the cold sweats continuing and increasing, with the addition of spasmodic rigors and subsultus tendinum, the tragedy soon finishes.

These are the symptoms of an *incarcerated hernia*, this their general progress, and their too frequent event. The first class of them imply some degree of hazard, but are often capable of being relieved without the use of the knife; the latter frequently require

it, and very often prove fatal by the neglect, or too late application of it.

Perhaps there is not in the practice of surgery a point which requires more judgment, firmness, or delicacy, than to determine the precise time, beyond which this operation should not be deferred, and for a surgeon to conduct himself so as to induce a patient to submit to it early enough for his preservation. The time in which a piece of gut will become gangrenous from stricture, or get into a state approaching to that of a gangrene, is extremely uncertain, and depends upon circumstances which no man can foresee. There have been several instances of ruptures, attended by pressing symptoms of stricture, which have been safely returned by the hand only, at the end of several days; or the operation having been performed at the same distance of time, the parts have been found sound or unhurt: on the other hand, there are many instances producible, of the intestine having been with great difficulty replaced, or of its returning, *suâ sponte*, from being mortified, or (the operation having been submitted to) of its having been found in such state by the operator, at the end of not many hours.

I have myself seen a small portion of the intestine become perfectly gangrenous, in one day and night from its first expulsion.

The directions which are given to us by writers, are not to be trusted without much circumspection; the signs or marks which they in general regard as proofs of the proper time for operating, are most frequent proofs that the time is just elapsed, and that, instead of waiting for the arrival of such symptoms, we should have prevented them. On the other hand, to propose an operation of so much consequence, before it shall be thought absolutely necessary, may admit of such misconstruction, as no man would wish to have put upon his conduct. Indeed, I do not know any situation, in which a judicious and prudent man can be placed, in which it will behove him to be more wary and circumspect, more delicate, or more steady.

The two principal circumstances which have most contributed to the infrequency of performing this operation, are, a dread of great hazard from the operation itself, considered abstractedly, and a fear of bringing a disgrace upon it, by having performed it

too late, *ne occidisse, nisi servasset, videretur.*[q] The first of these is vastly greater than it ought to be, and is most frequently the cause of the latter; so that if the one can justly be lessened, the other will not be so likely to happen.

That the operation considered simply is not void of hazard; every man who knows any thing of the nature of wounds in membranous and tendinous parts, must acknowledge: they are certainly subject to fever and inflammation, are difficult and slow of digestion, and in some particular habits are apt to become gangrenous; but that they are necessarily, or even most frequently hazardous, daily and manifold experience contradicts.

One evil is very frequently the parent of others. By being afraid of incurring that degree of hazard which is thought to attend the operation merely, the generality of people neither attend to, nor embrace the most proper time for the safe performance of it; or that in which its danger must be necessarily least, because least combined with that which may arise from the state of the parts within; a state even at first not absolutely safe, but which all delay beyond a certain time must hourly increase the hazard of.

If I might presume to give my opinion on this subject, I should say, that the operation ought always to be performed as soon as possible after it appears that all rational attempts, by large and free bleeding, the warm bath, clysters, &c. are found to be ineffectual, or that the symptoms rather increase than decrease, while such means are made use of, and that the[r] handling necessary for

[q] Celsus.

[r] Perhaps I may be thought somewhat singular; but from what I have seen, I am much inclined to believe, that when the parts are very painful to the touch, and the scrotum large, and much upon the stress, more harm is generally done by the manual attempts for reduction, than good. In this state, the great distention of the intestine renders it very incompressible, and very little likely to be returned through the tendinous aperture by mere force, (for such it is, in whatever degree it is used,) and either a brisk irritating purge, or a very stimulating clyster, (particularly the tobacco-smoke,) are more likely, by exciting the peristaltic motion, to disentangle it, than even the most judicious method of handling it. And in cases where such remedies have been previously used, I verily believe the sudden reduction of the piece of gut is often more owing to their effect than to that of the hand. But I

reduction becomes more and more painful; for if it be delayed until the inflammation has attained a certain height, though the parts upon being laid open are not found quite gangrenous, that is no proof that the want of success must be set to the account of the operation merely. That state of inflammation, either of the intestine or of the hernial sac, which is just not gangrenous, is no state of safety, nor are we sure that removing the stricture will at this time appease the symptoms, or abate the hazard: far from it: such an alteration may have already been made in the intestine, that a mortification will ensue, though it be set free and returned into the belly. A ligature need not be continued round any part of a living animal, until it becomes quite gangrenous, in order to produce its destruction. There is a certain point of time, in which the circulation is so prevented, that the same event will follow, though the ligature be then removed. It is indeed a nice and no very easy matter to find this precise time: but this difficulty and uncertainty are the strongest reasons for anticipating rather than waiting for it; for when in the present case such time arrives, or is nearly arrived, the risk of the operation becomes complicated with that arising from the diseased state of the parts within; and the chance of success is thereby much lessened.

A mortification of the intestine is not absolutely, necessarily, and always fatal: but the instances of those patients who have escaped with life in these circumstances are so very few, that it may fairly be reckoned among the deadly diseases. If the mortified gut returns back into the belly, upon the gangrene taking possession of the part which was bound, it will most probably prove fatal; and though there have undoubtedly been instances of people who have survived the operation, though it has been delayed till the parts have been in such condition, yet they are so very rare, that they are hardly sufficient to found a reasonable expectation upon; and of the very few who have thus escaped,

must desire that this may be rightly understood, and not mistaken for a dissuasive against manual attempts for reduction; I only mean, that there is such a state of an incarcerated intestine, (which state I have just described,) in which, from its size, inflammation, distention, &c. compression by the hand is very little likely to procure its return, and very likely, if it does not do so, to do considerable mischief.

the majority have been obliged to hold life upon terms which have been very fatiguing and disagreeable.

When the operation shall be thought necessary, the manner of performing it is as follows:—

The pubes and groin having been clean shaved, the patient must be laid on his back, on a table of convenient height, with his legs hanging easily over the end of it: then with a straight dissecting knife an incision must be made through the skin and membrana adiposa, beginning just above the place where the intestine passes out from the belly, and continuing it quite down to the lower part of the scrotum. Upon dividing the adipose membrane, there generally appear a few small, distinct, tendinous kind of bands, which lie close upon the hernial sac, which must be divided also, as well as the sac: the same knife with which the incision through the skin was made will execute this, which should be done with a steady hand and great caution, it being of very different degrees of thickness in different cases: in the bubonocele, or that which is confined to the groin, the sac is most frequently thin, consequently more easily divided, and requires greater attention in the operator: in the oscheocele, or scrotal hernia, if it be recent, the sac is usually thin also; if ancient, it is sometimes of considerable thickness; but whatever be the state of it, if the operator has any doubt, let him, as soon as he had made a small puncture in what appears to him to be the hernial sac, endeavour to introduce a probe into it: this will give him the necessary satisfaction; for if he has not pierced the sac, the probe will be stopped by the cells of the common membrane; and, if he has, it will pass in without any obstruction. The place to make the incision in the hernial sac is about an inch and a half below the stricture, and the opening need not be larger than just to admit the end of the operator's fore-finger, which, considering the great dilatability of these membranes, will be a very small one. The fore-finger introduced into this aperture is the best of all directors, and upon that a narrow-bladed, curved knife, with a bold probe point, will be the only instrument necessary to finish the operation. With this knife on the finger, (the point of the former being always short of the extremity of the latter,) the sac must be

divided quite up to the opening in the tendon, and down to the bottom of the scrotum.

Upon the first division of the sac, a fluid generally rushes out, which fluid is different in quantity, colour, and consistence, according to the date, size, and some other circumstances attending the rupture.

This fluid has sometimes been mentioned as a defence against an accident from the knife, in the first division of the hernial sac, as if it kept the intestine at such a distance, as thereby to lessen the hazard of its being wounded; but this is a very fallacious circumstance, and never to be trusted: the security of this operation depends entirely on a competent knowledge of the parts, a steady hand, and an attentive eye.

Different operators, especially among the French, have proposed a number of different instruments for the safe performance of this incision; the *bistouri cachée*, the *bistouri herniare*, the winged director, the blunt scissors, &c. &c. &c. all which are calculated for the defence and preservation of the intestine, in the division of the sac and tendon; but whoever will make use of the two knives just mentioned will find that he will never stand in need of any other instrument, and that he will with them be able to perform the operation with more ease to himself, with less hazard to his patient, and with more[s] apparent dexterity, than with any other whatever.

[s] They who are not accustomed to perform operations of such consequence as this is, are apt, from timidity, to be too sparing in making their external incision, by which means they add considerably to their own embarrassment, and to the fatigue of the patient. A free division of the hernial sac and scrotum, downwards, gives room for the more easy admission of the finger into the stricture, in order to divide it, and affords an opportunity of handling the intestine or omentum more gently, as well as more properly, in order to return them into the belly, both which necessary parts of the operation are much impeded by a small incision.

As therefore no possible advantage can arise from a small wound, but on the contrary it may be attended with great inconvenience both to the patient and surgeon, I would take the liberty of advising, when such an opening is made in the hernial sac as will admit the operator's fore-finger, and upon it his knife, that he immediately divide the sac and scrotum down to the bottom. It is true, that upon such division the quantity of intestine will seem to be increased, and an ignorant by-stander may be alarmed at this fallacious

The sac being laid open, the intestine generally pushes out immediately, (unless it is confined, by being enveloped in the omentum,) and appears to be much more in quantity than it seemed to be, while it was confined within the scrotum.

This is the time to try whether, by gently drawing out a little more of the gut, its bulk cannot be so reduced as to enable the surgeon to return it back into the belly, without dividing the tendon. In the case of the protrusion of a very small piece of intestine it has been found practicable, the difficulty of returning a large portion arising principally from the quantity of mesentery engaged in the stricture; and, indeed, though it may now and then happen that a small piece of gut may be returnable without a division of the tendon, yet, if it cannot be very easily accomplished, it had better not be attempted, since in the state in which this part must necessarily be to require the operation thus far, any degree of force used to it will, most probably, be more prejudicial and hazardous than the rest of it, if performed properly with a knife.

An attention to the natural structure, figure, and direction of the parts, will give us the best information how to make the division of the stricture to the best purpose, and with the least hazard.

The tendon of the obliquus descendens muscle runs in an oblique direction from above downward, and the natural opening which is always found in it, and through which the hernia passes, is made by a kind of separation of the fibres from each other. The direction of this opening is the same as that of the tendon, that is, obliquely downward, from the os ilion to the os pubis: the knife therefore should be so managed, as rather to continue this separation, than to make any transverse section; its edge should be applied to the superior and posterior part of the oval, and carried upward, and obliquely backward, until a sufficient opening is made to serve the purpose. By this means the fibres of the ten-

appearance, which is produced merely by the confined compressed gut being set free, and not by the addition of any more. The advantage which will arise to the operator, and consequently to the patient, from such division is real and great: it will enable the former to finish his work with freedom, and spare the latter a great deal of pain.

don will be rather separated from each other than cut, and in all probability the risk arising from the incision will be lessened.

It is generally advised to make the division of the stricture free and large, as well to permit the easy return of the parts, as to prevent the inconvenience which it is supposed will be more likely to attend a small wound in a tendinous body than a large one: the first intention, the easy return of the intestine, should certainly be fulfilled, and therefore the incision ought always to be large enough for that purpose, and to afford an opportunity of passing the end of the finger round on the inside in case of any adhesion; but as too large an opening may be attended with very ill consequence, it ought also to be guarded against. In the majority of cases, a small incision will be found sufficient for the purpose of reduction; and where the parts are free from adhesion, and the safe return of them is the only object of attention, a small division made in the manner already directed is not liable to any more pain and trouble than a large one, and may therefore be safely trusted.

Among the authors who write from each other and not from practice, are to be found accounts of cases, in which the tendon only has been divided, and not the hernial sac, which latter has been returned through the enlarged opening, with its contents enclosed; and the same writers are very particular in their directions how to accomplish this operation. If it was practicable, (which the universal adhesion of the sac with the cellular membrane of the spermatic chord renders absolutely not so,) there would be still several material objections to the doing it; which objections, as the thing is not capable of being executed, it is needless to mention.

Though I am perfectly satisfied that the case of a strangulated hernia is most frequently as I have represented it, *viz.* that the disorder in the intestine is originally produced by the stricture made on it by the borders of the tendinous opening of the abdominal muscle, and that the gut is in general perfectly sound, and free from disease, before it becomes engaged in such stricture, yet I think it right to acquaint the uninformed reader, that it has been and still is the opinion of some very ingenious men, that the disease is originally in the gut, and that the stricture is an accident

arising from the inflammation and distention of it; or, in other words, that the intestine is first inflamed, and, by means of the alteration produced by such inflammation, becomes too large for the tendinous aperture, which therefore makes a stricture on it, and which, they think, is the reason why the chirurgical operation is often unsuccessful.

For my own part, I cannot think that either the fact or the inference is in general true.

An inflammation most certainly may, and frequently does, attack any part of the intestinal canal; and consequently that part of it which happens to be included within a hernial sac may accidentally be so affected. When this is the case, the swelling and distention which naturally and necessarily attend an inflammation of the gut, will render it less capable, or perhaps quite incapable, of repassing the opening in the abdominal tendon, which tendon may therefore make such stricture on the part so diseased, as greatly to heighten the first symptoms, and bring on still worse; and when this happens, the operation will also be less likely to be successful, it being calculated for the relief of only such symptoms as arise from a piece of intestine (in other respects sound and free from disease) being so bound by the said tendon, as to have its peristaltic motion, and the circulation of the blood through it, impeded or stopped: whereas, the other complaint, consisting primarily and originally in an inflammation of the gut itself, the mere removal of it from stricture is not, nor can be, equal to the cure of the disease. That the case is a possible one I make no doubt, having once or twice seen it in old ruptures; but it is a very rare one, and by no means to be admitted either as a proof that the mischief done to the intestine, in the generality of strangulated ruptures, does not most frequently proceed from the stricture made by the tendon, or a dissuasive from performing an operation, whenever it would otherwise be thought necessary.

It is not however a mere speculative point; it is really a matter of consequence, and ought to be attended to by all those who have it in their power to make frequent observations on such subjects; for on the truth or falsehood of this doctrine depend a few very material points in practice, some of which ought so to in-

fluence a surgeon's conduct as to make it considerably different in one case from what it should be in the other.

Very bad symptoms, such as pain, tension of the belly, sickness, vomiting, hiccough, fever, and suppression of stools, are often produced in a very short space of time by the descent of a piece of gut, upon some exertion of strength in persons who were immediately before such accident at perfect ease, and free from all complaints relative to the belly. If the disease be not discovered, or if our attempts to reduce the intestine are not successful, these symptoms are heightened, and the patient often dies of a mortification: if we do succeed in the timely reduction, all these terrible symptoms often cease instantaneously, and the patient feels neither pain nor inconvenience of any kind from that moment. Would this most probably and most frequently happen, if the disease was generally in the intestine, and the stricture of the tendon merely accidental?

In that kind of disease of the intestinal tube, which is said to be produced by inflammation, and thought to be attended with spasmodic stricture, or contraction of its muscular fibres, there is such an alteration made in its peristaltic motion, and such impediment in the execution of its principal offices, that what is taken into the stomach is rejected by vomit, and fæces are not protruded through the colon and rectum, the belly is tight and painful, the skin hot, the pulse quick and hard, and the patient feels a restlessness and anxiety which are very disagreeable: this is one of those cases which require immediate assistance, and will admit of no delay: the progress of the symptoms from bad to worse is generally very rapid: and if the disease be not soon subdued, the patient dies. Free and repeated evacuation by phlebotomy and lenient purges, the use of a semicupium, a warm bath, clysters, and sometimes brisk cathartics, joined with opium, are the remedies generally prescribed, and if made use of in time are often successful; but if neglected, the case most frequently ends ill.

It is very true that the same symptoms occur in a strangulated hernia; but if that hernia be reducible, they generally cease upon such reduction, nor does the patient want any other assistance than what is necessary to prevent a new descent of the gut. In this respect therefore the two diseases differ very materially: in the

latter, nature stands in need of no further assistance from art, but as soon as the manual operation is performed, returns to the execution of her natural functions; in the former, she is found so very insufficient toward assisting herself, that it seems to be one of the few cases, in which medical assistance can hardly ever be dispensed with.

Now, if the bad symptoms attending an irreduced rupture were primarily owing to an inflammation of the intestine within it, and that the tendinous aperture made a stricture on it, only in consequence of the distention of the gut—allowing this stricture to aggravate the complaint considerably—yet the division of it, or the reduction of the intestine, can never be supposed to do more than alleviate or remove such aggravation; the original inflammation of the gut must still remain, nor can it be lessened by the intestine having been girt tight by the tendon; and yet, as I have just now observed, we very rarely (at least in ruptures that are not of ancient date) meet with any trouble or complaint after reduction is timely and completely made, and the intestine returned into the belly in a sound state; the vomiting most frequently ceases immediately, or in a very short space of time; a discharge is made by stool, the tension of the belly goes off, and though the patient is not always instantaneously well, in cases where the symptoms have been very threatening, yet all such complaints, as proceeded from an obstruction to the execution of the proper offices of the intestinal canal, generally disappear immediately.

From the nature and progress of the symptoms in a *miserere*, (as it is called,) from the extreme pain of the first attack, from the perfect ease a little while before death, and from the mortified appearance of the intestines after such event, I think it is most probable, that, if we could have an opportunity of seeing the intestine during the first part of this complaint, we should find all the appearances of inflammation: whereas, in many of those upon whom the operation for the bubonocele is successfully and timely performed, this is not the case; the intestine seldom bears marks of high inflammation, unless the operation has been long delayed, nor do the symptoms of such complaint usually attend afterward; the mortified part often does not exceed an inch, or an inch and a half in length, and is almost always confined to that part of the gut

which is on the outside of the tendinous opening, all within the belly being sound and fair. To which may be added this circumstance, that when the parts contained in a hernial sac become mortified by the delay of the operation, the sac itself, (which has no immediate connexion with the intestine or its vessels,) the cellular membrane covering it, nay the skin, is often found in the same state.

These are my principal reasons for believing that the mere stricture made by the tendon is, in the generality of incarcerated ruptures, not only a sufficient, but the primary, and indeed the sole cause of all the symptoms, and all the mischief; and therefore I must also be of opinion, that whoever neglects to perform, or at least to propose the operation, when he finds reduction impracticable, and the symptoms pressing, does in some measure contribute to the destruction of his patient.[t]

On the other hand, I am convinced, by some instances which I have met with, (and which one time or other I hope to be able to present to the public in a collection with many others,) that the opinion has some foundation in truth, and that persons labouring under old ruptures, which have been long in the scrotum without giving any trouble, in which the quantity of intestine is often very large, the tendinous aperture much dilated, and the hernial sac thick and firm, are those to whom this misfortune has happened, and who indeed, if their case be duly considered, will be found most liable to it; there being no reason in nature why that part of the intestine which is contained in such a hernia, should not be

[t] Indeed, though we should suppose the case to be as those gentlemen have represented it, *viz.* that the complaint begins in the intestine, and that the stricture made by the tendon is not a primary cause, but an effect of the disease, I do not see how we can avoid proposing the operation; for whether the increased size of the gut be owing to the inflammation, which renders it too large to pass the abdominal opening, or whether it be the mere effect of stricture made by the tendon, in either case it will bind equally, and the event must be exactly the same, as far at least as the stricture has to do with it: for when the intestine is inflamed, whether such inflammation preceded or succeeded the confinement of it by the tendinous opening, the symptoms can never be appeased, but by the release of the gut from its confinement.

subject to every complaint, or disease, to which every other part of that canal is liable; and this opinion I am more confirmed in, by having met with more than one subject with such old ruptures, who have had all the symptoms of a strangulation; and in whom, I am sure, there was no stricture made by the tendon, though the gut remained in the scrotum.

Although I have through the course of this section repeatedly recommended the early performance of the operation, yet I must desire not to be misunderstood, as if I meant to advise it before proper attempts had been made for reduction, or the symptoms become alarming; much less that I would propose it as a means to obtain a radical cure in those ruptures which are returnable by the hand merely; a thing boasted of, and practised by pretenders, but not to be thought of by any man who has either judgment, humanity, or honesty.

The only intent of it should be to preserve life, by rescuing the patient from the hazard of mortification, likely to ensue from the stricture; and though I have pressed it with such view, and in such circumstances, and think it ought always to be done, yet I should be very sorry to have it thought that I encouraged the performance of it wantonly, or unnecessarily, which must be the case, whenever it is done with any other intention.

Considered as a means to obtain a perfect or radical cure, or to prevent the necessity of wearing a truss, every man at all conversant with these things knows, that it most frequently fails of procuring that end; and that most of those people who have been obliged to submit to it for the preservation of their lives, have also been obliged to wear a bandage ever afterwards, to prevent the intestine from slipping down behind the cicatrix into the groin.

In short, though the danger from the operation, when performed in time, is in my opinion never to be mentioned with that which must arise from the stricture, if neglected, yet such operation never ought to be attempted but with a view to prevent the impending ill effects of such stricture, and will not ever (I dare believe) be put in practice with any other intention, by any fair or judicious practitioner, by any man who has the least regard for

his own character, his fellow-creature's sensations, or for any thing but money.[u]

The sac and stricture being laid open and divided, the contained parts come into view, and, according to the different circumstances of the rupture and of the patient, will be found in different states, and require different treatment.

These states are reducible to three general heads, that is, the contained parts will be found, either in a sound, healthy, loose, unconnected state, and fit for immediate reduction; or in a sound state, but, from some particular circumstances, incapable of being immediately replaced; or in an unsound diseased state, and requiring to be treated accordingly.

If the rupture consists of a piece of intestine only, and that neither mortified nor adherent, the sooner it is returned the better, and the more gently it is handled for reduction the better also.

If the intestine be accompanied with a portion of omentum, the latter (if in a proper state) should be returned first.

In returning the intestine, care should be taken to endeavour to put in that part first which came out last, otherwise the gut will be doubled on itself, and the difficulty and trouble be thereby much increased; and in making the reduction, the fingers should be applied to that part of the intestine which is connected with the mesentery, rather than its convex part, as it will both serve the purpose better, and be less likely to do mischief.

While the reduction is making, the leg and thigh on the ruptured side should be kept elevated, as such position of the limb will much facilitate the return of the parts.

Long confinement in the scrotum will, in some people, produce slight adhesions, by slender filaments, which are generally very easily separated by the finger, or divided by a knife, or scissors,

[u] Perhaps it may appear extraordinary, but this necessarily severe operation has, by some of our modern quacks, been recommended, and even practised, for the cure of omental hernias: more than one person has lost his life, that is, has been murdered in the attempt: but that seems to be a circumstance of small importance in the minds of these operators, nor does it at all prevent the credulous part of mankind from trusting them; though one would imagine that much stronger proofs, either of the judgment, humanity, or honesty of such practitioners, were not requisite.

whether the adhesions be of the parts of the intestine *inter se*, or to the hernial sac. If the adhesion be of the former kind, and such as proves very difficult to separate, it will be better to return the gut into the belly as it is, than to run the risk of producing an inflammation by using force: if it be of the latter, that is, if the connexion be with the sac, there can be no hazard in wounding that, and therefore it may be made free with.

It has been said by some writers, that if the piece of omentum be so very adherent that the surgeon does not choose to separate it, that it may very safely be left, that it will first suppurate, and then shrink, and very little retard the healing of the sore. What experience the gentlemen who talk in this manner may have had of this kind of case, I know not; but I never yet have seen any, in which it could possibly be thought necessary to leave the patient in such circumstances, or in which an attachment of the omentum was incapable of being set free, either by dissecting its adhesions, or retrenching a part of it.

The prolapsed part being replaced, the next object of consideration is the hernial sac: this, if large, thick, and hard, will prove slow and difficult of digestion, render the edges of the sore tumid and painful, and often retard a cure considerably, by producing troublesome abscesses in the scrotum.

A considerable part of it may very safely and properly be removed: no part of it is of any consequence except the posterior, or that with which the spermatic vessels are connected: all the rest being loose, by means of the cellular membrane, is therefore very easily separable, and had therefore better be removed than left.[x]

[x] The removal of part of the sac might have been right when the practice was to fill the cavity with dressings, which induced a necessity for the membranous sac to slough, but was very contrary to Mr. Pott's practice in the latter part of his life; and, if he had lived to produce a new edition of this treatise, as he had projected, I have no doubt but that this passage would have been altered. The method which we have long used, and which Mr. Pott himself practised, is this: when the contents of the sac are returned into the abdomen, the sides of the scrotum are brought together, by which means the parts of the divided sac are also brought into contact, a large armed needle is then passed through the upper part of the scrotum near to the abdominal ring, and made to dip down, so as to pass through the sides of the sac, but by no means so deep as to run any risk of including, or even injur-

It has been proposed by theoretic writers to pass a ligature round the upper part of the neck of the sac, in order, as it is said, to procure the union of its sides, and thereby more certainly to prevent the future descent of any thing from the belly; but to this there are many objections: the principal of which are, that if the ligature was not made strict, it could serve no purpose; and if it was, it would be very likely to injure the spermatic chord, if included in it. By preventing part of the discharge, it might also occasion very troublesome symptoms, and, upon the whole, is by no means advisable.

It has also been supposed, that the intestine may be found so inherent as not to admit of being set free; and in this case, it has been advised to remove the stricture, by dividing the sac and the tendon, and then to leave the parts loose. This is mentioned by many writers of eminence, and therefore I have taken notice of it, though it is a kind of case which, I must own, I have never seen, nor do I suppose that I ever shall. I have seen the intestines very firmly adherent to each other, to the sac, to the omentum, and to the testicle; but, never in such a state of adhesion, as to be incapable of being returned. The adhesion of the parts of the intestine *inter se* are most frequently easily separated; but if they should not, still these are no hinderance to the gut being returned; and if the caul be so connected as to prove troublesome to detach, it may with great safety be cut off; so that the connexion here meant must be of the intestine with the hernial sac: of these two parts we are interested only for the preservation of one, and may without hazard make free with the other. The separation may indeed be tedious, and sometimes difficult; but, let the difficulty or trouble be what they may, the separation must be accomplished, it being ab-

ing, in the smallest degree, the spermatic vessels, by which mode the objection in the paragraph which follows in the text, is done away; the ligature is then to be tied moderately fast, which makes a powerful barrier against the reprotrusion of the intestine. Two or three stitches, according to the size of the incision, are then to be made through the sides of the divided scrotum: there is no necessity for these to pass through the sac, as the only intention of them is to keep the parts together, so as to prevent the exposure of the sac, by which means no digestion of it will take place, but the parts will coalesce, and generally heal by the first intention. E.

surd to think of leaving a piece of intestine loose, in the divided scrotum, which, from the removal of the stricture above, will be liable to be increased in quantity, from every unguarded motion, and subject to all the inconveniences which the influence of the air must necessarily produce on such tender parts; not to mention the great difficulty of managing the sore in this state, and the pain and other bad symptoms which must arise from the daily uncovering the intestine. Any trouble, therefore, which may attend the separation, must be submitted to, rather than to follow this strange advice, which, indeed, the writers who give, seem not to understand; for, to leave the parts as they were found, and as they direct, is impossible: they were found contained in a hernial sac, and in the scrotum, defended from the air, and in some degree limited as to quantity, both by the stricture above, and the sac below; the necessary operation has removed that stricture, divided the sac and scrotum, and set all loose and free; and, therefore, if the intestine be not returned into the belly, and kept there, the quantity which may fall out may be so large as to produce the most fatal consequences, notwithstanding any attachments which some part of the canal may have contracted.

SECT. VI.

Hitherto the parts composing a rupture have been considered as displaced, as inflamed, as having contracted unnatural connexions and adhesions, but being still so unhurt in their texture as to remain sound, within the laws of the circulation, fit to be returned into the belly, and affording a reasonable prospect of success in the event.

But, on the other hand, if the inflammation ran very high, and has either been neglected, or not given way to proper treatment, and the operation has been too long deferred, the parts, though loose, may become so diseased, as to be unfit for immediate reduction.

The disease here meant is gangrene, or mortification, produced by the stoppage of the circulation of the blood through the part which is on the outside of the stricture. The gangrenous or mortified state of these parts may be of more or less extent, according to the quantity contained in the sac; but be the extent of such disease what it may, the part so affected ought never to be returned loose into the belly, (more especially if it be intestine,) without some caution.

The omentum indeed may be made more free with. If this be so altered as to be plainly unfit for immediate reduction, it may be removed; that is, the altered part may be cut off from the sound.

This is certainly true; but it is a point of practice which appears to me to deserve somewhat more regard than is most commonly paid to it by writers. All that is generally said of it is, that if the omentum be found in an unsound state, a ligature should be made on it just above the altered part: what is below such ligature should be cut off, and the ligature should be left hanging out of the wound, that it may more easily be taken away, when it is cast off. This is the general doctrine, and indeed the general practice; but which I cannot help thinking is delivered down, and followed by us, somewhat inconsiderately.

When the omentum is in such state as to be fit for being returned into the belly, such return ought never to be neglected or omitted; the uses of the caul are great and obvious, and the want of it must be productive of inconvenience to the patient; its warmth, its greasiness, its lubricity, its extension over the surface of the intestines, together with the constant motion of that canal, prove its utility, and in some measure point out what the inconveniences must necessarily be, which follow the removal of it. But it is sometimes found in such state, as to be unfit for reduction; and then we must embrace the lesser of the two evils, and remove such part of it as we ought not to return. This is said by every body, and is certainly true; but seems to me, as I have just now observed, to require more consideration than is generally spent upon it, as well with regard to the state requiring such operation, as the manner of executing it. It is commonly said, that if it be found in large quantity, considerably hardened, or if

it be altered in its texture, (that is, by gangrene or mortification,) that it ought to be retrenched. The two states said to require this retrenchment are very materially different from each other: the necessity of it in the latter is evident; but I cannot help saying, that I think it is ordered in the former very unnecessarily; and that the general method also of performing it in the latter appears to me both injudicious and prejudicial. There may possibly now and then occur a case, in which such alteration may have been made in the mere form and consistence of the prolapsed piece, by induration, enlargement, &c. that the removal of a part of it may become necessary; but this, though it does happen sometimes, is very unfit to be made a general rule of. The reason given is, that it will lie uneasy in a hard lump within the patient's belly; which is not necessarily or generally true, as I have several times experienced; having returned it when its form and consistence have been much altered, without finding any future inconvenience: so that such alteration merely is not a general reason for cutting it off. On the other hand, I am ready to allow, that it sometimes is, and that the piece of caul so altered had better be removed, and that it may also be so connected, that it will be more to the patient's advantage to have such connected part taken away at once, than to go through the pain and fatigue which the separation may require; in which case, my objection lies principally against the prescribed method by ligature. Indeed, when it is in a gangrenous state, a part of it must necessarily be removed, as such state makes the return of it into the belly highly improper. To accomplish this, we are ordered to make a ligature on the sound part of the omentum, just above what is altered, and then to cut it off immediately below such ligature: and the reason given for doing it in this manner is, that all the altered part may be removed without any risk of hæmorrhage. This method of acting is founded on a groundless fear, and is often attended with bad consequences, which, not being supposed to flow from this cause, are not set to its account.

The fear of hæmorrhage from the divided vessels, if the omentum be cut in a sound part, and the apprehension of mischief likely to ensue from the shedding of sanies or matter into the belly, if the division be made in the diseased, gave rise to the

practice of tying it before amputation; but neither one nor the other of these apprehensions is well-grounded, nor are they sufficient reasons for such practice.

The fear of hæmorrhage is almost if not perfectly without foundation, as I have several times experienced; and the discharge of a fluid of whatever kind from the border of the divided membrane, is of no consequence at all; neither would the ligature prevent it if it was, as must appear to every one who will give the subject one moment's serious consideration.

But this is not all: I am sorry to say that I am by experience convinced, that making a ligature on the caul is not only unnecessary, but frequently pernicious, and sometimes even fatal.

A mere theoretical consideration of the parts will convince any one of the probability of mischief arising from such practice; but, besides these considerations, I can take upon me to say, that I have seen it add to the hazard of the case, and more than once destroy the patient. I have seen the omentum become diseased, and gangrenous in all its extent above the ligature, between it and the stomach, when it was not gangrenous at all before it was tied; but on the contrary, in a sound state, and only tied in order to its being more securely retrenched. I have seen a whole train of bad symptoms, such as nausea, vomiting, hiccough, fever, anxiety, restlessness, great pain in the belly, and an incapacity of sitting upright, or even of moving without exquisite pain, precede the death of a man, whose omentum was tied merely because of its enlargement, whose intestines uninterruptedly, from the time of the operation to his last hour, performed their proper office of discharging the fæces, and were found perfect and untainted after death, but whose omentum appeared in a highly inflammatory state in general, and in many parts above the ligature gangrenous.

The direction given by many writers to put the patient's body in motion, or to give him a kind of shake, in order to set to rights the disturbance and derangement produced by tying the caul, would be too absurd to mention, did it not serve to prove, that even the very people who have persisted in this pernicious practice were themselves sensible of some of its probable ill consequences, though they would not try to remedy them: they thought, that those which might follow from hæmorrhage, or the discharge

of sanies, were still greater, but made no experiment, in order to know whether they were or not.

I will not pretend to say, that there never was a dangerous or fatal flux of blood, from the division of the omentum, without ligature: but I can truly say that I never saw one; that I have several times cut off portions of it, without tying, and never had trouble from it of any kind, though I have always made the excision in the sound part; and that, from the success which has attended it, I shall always continue to do so, whenever it shall become necessary. Upon the whole, I cannot help thinking the ligature both unnecessary and pernicious, and can venture from experience to say, that any portion of the caul, which it may be thought necessary to remove, may very safely be cut off, without any previous tying.

The best and safest method of performing this operation, is with a good pair of straight scissors, having first expanded it, as well on account of its more easy division, as to prevent the mischief which would attend the cutting a piece of intestine, if it should chance to be wrapped up in it; and if any fear still remains of hæmorrhage, the excision may, in the case of mortification, be made just within the altered part of it; in which case, there will no more be left to be cast off, than there must be when a ligature is made.

If the gangrene, or sphacelus has taken possession of the intestine, and consists of a small spot only, which, by casting off, might endanger the shedding its contents into the belly, the method of endeavouring to prevent that inconvenience is by connecting the upper part to the wound by means of a needle and strong ligature: by this means, when the mortified part separates, the fæces are discharged by the wound for some time; after which it has been known to contract gradually, and heal firmly: but whether the event prove so happy or not, this method of securing the gut should never be omitted.

In making this artificial attachment of the intestine to the inside of the belly, care must be taken not to wound the gut; the needle must be passed through the mesentery, at a small distance from the intestine, and such a portion of that body included within the stitch, as shall be likely to hold fast long enough to render

the connexion probable. If the altered portion of the gut be of such extent as to require excision, but yet not so large as to prevent the extremities of the divided parts from being brought into contact with each other, their union must be endeavoured by suture. In doing this, the ends of the intestine should be made to lay somewhat over each other, by which means the suture will be the stronger; and when the two ends are thus sewed together, they must both be fastened to the inside of the belly, at the upper part of the wound, that in case the union does not take place, the discharge of fæces may, if possible, be made through the groin. But if the disease be of such extent as to prohibit the bringing the two ends together, the treatment must be different. In this case, as it is impossible to preserve the continuity of the intestinal canal, the aim of the surgeon must be to prevent the contents of it from being shed into the belly, and to derive through the wound in the groin all that which should, in a sound and healthy state, pass off by the rectum and anus.

To accomplish this, he must take care that neither extremity of the divided intestine slip out of his fingers; then with a proper needle, and a strong ligature, he must connect both of them to the upper edge of the wound. The suture, with which the connexion is made, must not be slight, lest it cast off before a due degree of adhesion is procured; and it must also be made in such a manner as to preserve the mouth of the gut as free and as open as may be, upon which the patient's small remaining chance does in some measure depend. The method advised by La Peyronie, of stitching the mesentery instead of the intestine, is judicious and right.

The dressing in this case should be as soft and as light as possible, nothing heavy, nothing crammed in, nothing which can irritate or give pain; and the patient must observe the most rigid severity of diet, and the most perfect quietude both of body and mind. With regard to medicine, whatever is exhibited must be calculated to procure rest and ease, to quiet the febrile heat, to keep the body open, and, if necessary, (as it most frequently must be,) to resist putrefaction. All the rest must be left to nature, who is by her great Creator furnished with such powers, as sometimes to produce wonderful effects, even in these deplorable cases.

This is the substance of the best practice, and of the most approved doctrine, in these circumstances, and which has sometimes been attended with a fortunate event; but the practitioner who is so situated as to see but little of this kind of business, ought to be apprised how very little reason there is to hope for, or to promise success.

More censure is incurred by an unguarded prognostic, than by a successful event, if properly and judiciously foretold; and if a man were to form his judgment upon this, and some other hazardous disorders, from books only, he would expect very little of that trouble and disappointment, which he will most certainly meet with in practice.

Writers in general are too much inclined to tell their successes only, and are fond of relating cases of gangrene and mortification, in which large portions of intestine have been removed, the proper operations performed with great dexterity, and in which the events proved fortunate; and of this they all give us instances, either from their own practice, or that of others, or perhaps sometimes from imagination; by which the young reader is made too sanguine in his expectation.

That these extraordinary successes do sometimes happen, is beyond all doubt; and it is every man's duty to aim at the same by all possible means: but still the inexperienced practitioner should also be informed, how many sink for one that is recovered, and how many favourable circumstances must concur, with all his pains, to produce a happy event in these very deplorable cases. Without this caution, he will meet with very irksome disappointments; and, having been often baffled, where he thought he had good reason to expect success, he will sometimes meet with it so very unexpectedly, that he will be inclined to believe the sarcastical distinction between cures and escapes not ill-founded.

To say the truth, the hazard is so great, and the utmost power of art so little, that what Iapis said to Æneas with relation to his cure, may with great propriety be said here:

> Non hæc humanis opibus, non arte magistra
> Proveniunt; neque te Ænea mea dextera servat:
> Major agit Deus.

SECT. VII.

The portion of intestine, or omentum, which composed an hernia, being replaced while sound and unhurt either by inflammation or gangrené, it had always till very lately been supposed, that if a new descent of them were prevented by the immediate application of a bandage, no mischief would be likely to ensue; and that, while the truss executed its office properly, the patient would be thereby free from danger.

But, within these few years, it has by some of the French writers been said, that the hernial sac may be so loose and unconnected with the spermatic chord, that it may be returned into the belly, while it contains a portion of the intestine, labouring under a stricture made by the neck of the said sac; and of this they have given instances of cases—or of what appeared to them to be so.

Mr. Le Dran tells us, that, in one of these, the rupture was with some difficulty returned, but, the symptoms nevertheless continuing, the patient died; and that, upon opening the body, he found the hernial sac, including a considerable portion of intestine, returned into the belly; and that the stricture made by the neck of the sac, bound so tight, that he could not disengage the gut from it without cutting it. His words are:—

"Nous trouvames dans le ventre le sac herniare, qui avoit trois "pouces de profondeur, sur huit pouces de circonference, et dans "ce sac etoit encore enfermée une demie aulme de l'intestin "jejunum. Tenant le sac à pleine main, je voulus en faire sortir "l'intestin, en le tirant par l'un des bouts; mais la chose me fut "impossible, tant l'entrée du sac etoit reserrée, et je n'en vins au "bout qu'en dilatant cette entrée avec les ciseaux," &c.

In De la Faye's notes on Dionis, may also be seen an instance of this kind of case, or at least of what was taken for such.

I have already given my opinion concerning the practicability of returning a hernial sac back into the abdomen, after it has been out any considerable length of time. I never saw, either in the dead or the living, any reason to suppose it possible: the assertions of these gentlemen are very positive, and I must leave the reader to judge of them as he can.

The straitness of the neck of the sac is supposed to be produced by the pressure of the bolster of a truss, worn to keep the parts from descending. This part of the supposition is probable: but, it must also be considered, that the same pressure must almost necessarily occasion adhesions of the outside of the sac to the surrounding cellular membrane; and, if we were to suppose the sac loose and unconnected in every other part, (a thing, I must own, I never saw,) yet this alone would for ever prevent its return into the belly.

It is indeed represented as a circumstance not very frequently occurring, which is fortunate for mankind; as it can neither be foreseen nor prevented, and would add considerably to the hazard of ruptures.

It is said, that, by carefully attending to the manner in which a rupture goes up, we may distinguish whether the sac returns with it or not; that if it does, including the gut, a hard body will be perceived to pass under the finger, and that the intestine, in its passage through the abdominal opening, will not make that kind of guggling noise which it is usually found to do, when the sac does not return with it. This, instead of being the characteristic mark of the return of the sac, will almost always be found to be the case when a portion of omentum which has been much compressed, goes up at the same time with the gut; and therefore, however ingenious this observation may seem, considered theoretically, it is not to be depended upon in practice.

But supposing we had some clear and undoubted marks, by which we could always know when this was the case, I do not see how we could avail ourselves of them: the intestine must be returned before we can have our information; and if, instead of the uncertain, delusive reasons just given, we had the clearest and most satisfactory marks of what is suspected, we have no remedy, but a very perplexing, tedious, and painful operation, which, I fancy, as few surgeons would in these circumstances choose to perform as patients submit to.

I call these marks or symptoms, which these gentlemen have given us, doubtful and delusive, because they do not with any degree of certainty indicate the cause to which they are owing, or from which they arise; for the inflammation excited in the intestine by its having been engaged for some time in a stricture, will

sometimes produce all the same complaints after its return: but no chirurgical operation will relieve them.

In the common reduction therefore of an intestinal rupture by the hand, I do not see how we can avail ourselves of this supposed discovery; and when the operation by the knife becomes necessary, it can be of no consequence at all; for if the operation be properly performed, the hernial sac will be divided through its whole length, before the instrument reaches the tendon; and therefore the gut can never be returned, while bound by any stricture from the former.

It has indeed been said, that till this discovery was made, the stricture of the abdominal tendon, and the adhesion of the contents of the hernial sac to its sides, were the only known reasons why any rupture should be irreturnable; and that when such case occurred, if the tendon only was divided, and the sac reduced unopened, the patient might be lost, notwithstanding all that had been done. To this I can only say, that a stricture, made by the sac only, is far from being a thing unknown, and is one of the principal reasons why all judicious writers and practitioners have advised it to be always divided; and when this is properly executed, no such consequences can follow, even if the hernial sac should be (what I have never yet seen) capable of being returned into the belly.

SECT. VIII.

Ruptures through the openings of the tendons of the oblique muscles in females are subject to the same symptoms, and require nearly the same general treatment, as the inguinal ruptures of males; and, like them, frequently admit of perfect cure, if not mismanaged or neglected at first: the same kind of truss is also necessary, and the same cautions with regard to the manner of wearing it.

The open texture of the cellular membrane surrounding the spermatic vessels, and the laxity of the scrotum, render the hernial

tumor much larger in males than it can well be in females: neither can it descend so low in the latter, as it does frequently in the former, for reasons which are obvious.

The female hernia, if recent, has much the same appearance as the bubonocele in man; and when more of the gut or caul is thrust forth than will lie conveniently in the groin, it pushes down into one of the labia pudendi, and sometimes forms a tumor of pretty considerable size.

When easily reducible, like that of men, it gives but little pain, and generally returns into the belly upon going to bed, or upon the patient being laid in a supine posture. When it is bound by the opening of the abdominal tendon, and is therefore difficult, or incapable of reduction, it is attended with the same symptoms as the incarcerated hernia in man, and requires the same general treatment, of bleeding, clysters, purges, warm bath, &c. and (these failing) the chirurgic operation; by which the hernial sac is laid open, and the stricture made by the tendon, divided.

In males, the cellular membrane which surrounds the spermatic vessels and the hernial sac is generally so thickened by distention, as to take some little time to cut through, and proves thereby a kind of security to prevent the sac from being too hastily opened; but in females it should be remembered, that the hernial bag lies immediately under the membrana adiposa, and requires to be very cautiously divided, on account of its contents: nor have I in general observed the fluid contained in the hernial sac of females to be equal to that which is found in males.

The piece of intestine which is strangulated in the female bubonocele is sometimes so small, as to occasion very little tumor; and therefore, if recent, is very often, in modest women, not known to be the cause of the symptoms which it produces. If by accident it returns back before it is hurt in its texture, the disease passes for a colic; if it proves fatal by mortification, it is taken for a *passio iliaca*, or *miserere*. The means made use of for the relief of either of those diseases, being such as will not, in general, without the assistance of a surgeon's hand, procure a return of the protruded gut, many an useful life has been lost by the real cause of the mischief not being known. Every symptom (the tumor excepted) which accompanies a rupture labouring under

stricture, may attend a passio iliaca; that is, an inflammation and obstruction to the execution of the office of the intestine, whether produced by the stricture of the abdominal tendon, or the spasmodic contraction of its own muscular fibres, will be attended with the same kind of symptoms: but though the general means of relief are alike in both cases, yet the former requires also the assistance of a surgeon's hand to replace the piece of intestine, or all the rest will be absolutely ineffectual: if that be neglected, the case in general will end ill, and though the mischief is set to another account, and supposed to have been without remedy, yet it is very certain that timely assistance would very frequently prevent such bad consequences. It therefore behoves every medical man, who may be called to women labouring under such complaints, to be very attentive to them; and if the symptoms run high, never to omit inquiring whether there be any tumor in the groin, belly, or pudenda; and if there be such, to be informed of what nature it is, before he goes any further, or loses any more of that time, which in all these cases is so very precious.

In the case of the dolor colicus, the pain is either round about the navel, or diffused in general all over the belly: that arising from a strangulated rupture is also very frequently general all over the belly, but is always more particularly acute at the groin, which part is also remarkably tender to the touch. The tension of the belly, and the vomiting in the passio iliaca, are in general the first, at least they are very early symptoms; whereas they do not come on in ruptures, till after some time is past. Perhaps some other minute distinctions might be made between the apparently similar symptoms of the two diseases: but the best and most infallible way to know what the real state of the case is, and thereby what ought to be done, is to have the parts examined where such tumor may be expected. This removes all doubt, and gives the practitioner the satisfaction of knowing, that, let the consequence be whatever it may, he is pursuing a rational and probable method of relieving his patient.

SECT. IX.

The crural, or femoral hernia, receives its name from its situation, the tumor occasioned by it being in the upper and fore part of the thigh.

To understand rightly the nature and situation of a crural rupture, it is necessary to attend to the anatomical structure and disposition of the obliquus descendens muscle of the abdomen. Whoever does this, will find that that part of it which runs obliquely downward from the spine of the os ilion, towards the simphysis of the os pubis, is tucked down, and folded inward, as it were. This edge or border, so folded in, is what is called the *ligamentum Poupartii* by some, by others the *ligamentum Fallopii*, as if it was a distinct and separate body, but is really no more than the inferior border of the tendon of the oblique muscle. In all the space between these two attachments, this tendon is loose and unconnected with any bone. All the hollow, which is made by the form of the os ilion, between the point of the attachment of the ligament or tendon to that bone, and its other connexion at the os pubis, is filled up by cellular membrane, fat, and glands; which parts are covered, and braced down, by a fine tendinous expansion, communicating between the tendon of the obliquus descendens abdominis and the fascia lata of the thigh.

Under this tendon, or ligament, the parts composing a hernia pass, and produce a tumor on the upper and fore part of the thigh. The sac is generally described as passing over the crural artery and vein, which are said to lie immediately behind it; but whoever will examine the state of these parts in a dead subject, will find that this is not a true representation: the descent is made on one side of these vessels, nearer to the os pubis; and the hernial sac, if it be not greatly distended, lies between the crural vessels and the last mentioned bone, on which it rests.

The femoral hernia is not so subject to stricture as the inguinal, there being a larger space for the intestine to occupy: but when such mischief does happen, the symptoms are so exactly the same as they are in a strangulated inguinal hernia, that it is quite unne-

cessary to repeat them in this place. The method of attempting reduction, and the treatment of the patient in case of difficulty, are the same also; excepting that, in the inguinal, the part to be reduced should be pressed obliquely toward the os ilion; in the femoral, the pressure ought to be made directly upward, or a little toward the pubes.

When it is not reducible by the hand only, it, like the other, becomes the object of a chirurgic operation, by which the sac is laid open, the stricture removed, and the prolapsed parts returned.

The incision should be made through the skin, and membrana adiposa, the whole length of the tumor: under these will be seen the tendinous fascia, or expansion, and immediately under that the hernial sac. These being carefully divided, and the portion of intestine thereby denuded, it is well worth while to try if it cannot be returned without dividing the tendon, as there is a considerable space between the os ilium and the os pubis, to manage such reduction in, and as the division of the tendon is not always, in this kind of rupture, so safely executed. In this there are two parts of consequence, which lie very little out of the way of the knife, and which an operator should avoid wounding: these are the epigastric artery, and the spermatic chord. If the division of the ligament be made directly upward, the spermatic chord will certainly be divided; and if, to avoid that, the knife be carried very obliquely towards the os ilium, the artery will meet with the same fate; and indeed if the incision of the ligament be made of any length, let it be made in whatever part it may, the risk will be great of wounding one of the parts just mentioned, as will appear to any body who will examine them *in situ naturali*, and make a proper allowance for the pressure and distention of the hernial sac.

Of the two, the spermatic chord is certainly the most to be regarded, as the total division of it would, in all probability, render the testicle on that side useless. If the artery be wounded, it must be taken up with a needle and ligature; but the doing is not so easy as the directing it to be done: the epigastric artery in many men is near as large as the smaller carpal; departs immediately from the trunk of the crural, and, at its origin, lies in a bed of fat and cellular membrane; the stream of blood would be pretty brisk,

and the passage of the needle round would certainly be troublesome, if not hazardous, from the vicinity of the crural vessels. It may undoubtedly be happily executed; but, as it must be attended with a good deal of trouble, and some risk, it is much better to avoid the necessity, which I think may always be done, considering the large space between the os ilion and the os pubis, and that the space is occupied principally by cellular membrane and fat: or if the division of the ligament be unavoidable, let the operator be particularly careful to keep the extremity of the probe-pointed knife within the end of his fore-finger, held up tight just behind the edge or border of the tendon, and to make as small an incision as may be necessary: the probe-scissors, the common instrument in use for this operation, is in this case particularly hazardous and improper.

In all other circumstances, this hernia, and the inguinal, are so similar as to need no repetition.

SECT. X.

THE CONGENIAL HERNIA.

The *congenial hernia*, as it is now called, is that particular kind of hernia, in which the portion of intestine, or omentum, which occasions the tumor, instead of being found alone in the hernial sac, (as in a common rupture,) is found in contact with the naked testicle; the bag containing it being formed by the *tunica vaginalis testis.*

The manner in which a common hernial sac is formed, has already in a former chapter been related, *viz.* by the thrusting forth of a portion of the peritoneum through the opening in the tendon of the external oblique muscle of the abdomen; which portion, so thrust forth, contains a piece of intestine, or omentum, or both. A hernial sac thus formed, always communicates with the cavity of the belly, but never with that of the tunica vaginalis testis. It

passes down anterior to the spermatic chord; and, when it is laid open, is found to contain only a portion of gut, or caul, and a small quantity of fluid.

On the contrary, the sac of a congenial hernia is formed by the tunica vaginalis testis itself; and, when it is laid open, (whatever else may be in it,) it is always found to contain the testicle, covered only by its proper coat, commonly called tunica albuginea.

The manner in which this is brought about, the original or early situation of the testes in a fœtus, their descent, their protrusion from the cavity of the belly, and the formation of the tunica vaginalis testis, I have described so much at large in two tracts already published,[z] that I shall give a very short account of them in this place.

That bag which is designed to make the future tunica vaginalis testis, is an originally formed part, lies in the groin, under the skin and adipose membrane, and has an orifice always open to the abdomen of a fœtus. By means of this orifice, the testicle at proper time descends into the groin first, and then most commonly into the scrotum; and, when it has been some little time in the latter, the opening from the belly generally becomes close, and is obliterated. By the closing of this passage, a bag or cavity is formed, which contains within it the testicle, covered only by its tunica albuginea, and which bag never afterward has any communication with the orifice into the cavity of the belly.

The time at which the testicles are thrust forth from the belly is very uncertain, as I have often experienced; and so is that of the absolute closing of the sacculus. In some they pass out before birth, in some immediately after, and in some not till some time after; in some they never pass out at all, and in others, they (that is, the two) arrive in the groin, or scrotum, at different, and sometimes very distant times. In short, the intention of nature, and her process, is in general regular and plain, but it is accomplished at dif-

[z] An Account of the Congenial Hernia, published in 1757; and some Observations on the Hydrocele, published in 1762. In Dr. Hunter's Medical Comment, No. 1, may also be seen a very ingenious account of this matter, by his brother Mr. John Hunter.

ferent periods in different persons; and sometimes, like most other parts of the animal economy, it is totally prevented by accident, or malformation.

The intrusion of a piece of intestine, or omentum, into the orifice of the tunica vaginalis, is one of these accidents. By means of either of these, the closing of the passage is prevented, and a hernial sac of a particular kind formed. This sac being really the vaginal coat of the testis, must, if that body has fallen from the abdomen, contain the intestine, omentum, or whatever forms the hernia and the testicle in immediate contact with each other.

This is the congenial hernia; a disease unknown till within these few years, but by no means an infrequent one.

The appearance of a hernia in very early infancy will always make it probable that it is of this kind; but in an adult, there is no reason for supposing his rupture to be of this sort, but his having been afflicted with it from his infancy: there is no external mark or character, whereby it can be certainly distinguished from one contained in a common hernial sac; neither would it be of any material use in practice if there was.

When returnable, it ought like all other kind of ruptures to be reduced, and constantly kept up by a proper bandage; and when attended with symptoms of stricture, it requires the same chirurgic assistance as the common hernia.

In very young children, there are some circumstances relative to this kind of rupture, which are very well worth attending to, as they may prove of very material consequence to the patient.

A piece of intestine, or omentum, may get pretty low down in the sac, while the testicle is still in the groin, or even within the abdomen; both which I have seen. In this case, the application of a truss would be highly improper; for in the latter, it might prevent the descent of the testicle from the belly into the scrotum: in the former it must necessarily bruise and injure it, give a great deal of unnecessary pain, and can prove of no real use. Such bandage therefore ought never to be applied on a rupture in an infant, unless the testicle can be fairly felt in the scrotum, after the gut or caul is replaced; and when it can be so felt, a truss can never be put on too soon.

As this kind of rupture is subject to stricture with all its con-

sequences, as much as that which is contained in a common hernial sac, and therefore liable to stand in need of the chirurgic operation; it may be very well worth an operator's while to know, that an old rupture, which was originally congenial, is subject to a stricture made by the sac itself, independent of the abdominal tendon, as well as to that made by the said tendon.

Whether this be owing to the weight of the testicle at the bottom of the sac, and the endeavours which nature makes to close the upper part of the tunica vaginalis, or to what other cause, I will not pretend to say; but the fact I have several times noticed, both in the dead and in the living. I have seen such stricture made by the sac of one of these herniæ, as produced all those bad symptoms which render the operation necessary; and I have met with two different strictures, at near an inch distance from each other, in the body of a dead boy about fourteen, one of which begirt the intestine so tight that I could not disengage it without dividing the sac.

In this kind of hernia I have also more frequently found connexions and adhesions of the parts to each other, than in the common one; but there is one kind of connexion sometimes met with in the congenial hernia, which can never be found in that which is in a common hernial sac, and which may require all the dexterity of an operator to set free; I mean that of the intestine with the testicle, from which I have more than once experienced a good deal of trouble.

When a common hernial sac has been laid open, and the intestine and omentum have been replaced, there can be nothing left in it which can require particular regard from the surgeon; but by the division of the sac of a congenial hernia, the testicle is laid bare, and after the parts composing the hernia have been reduced, will require great regard and tenderness, in all the future dressings, as it is a part very irritable, and very susceptible of pain, inflammation, &c.[a]

[a] The method of bringing the parts together, and retaining them so as to exclude the air, (mentioned in a former note, in this volume,) is equally applicable to cases of congenial herniæ; and as it will prevent the exposure of the testis, all future dressings of it will be unnecessary.

If a large quantity of fluid should be collected in the sac of a congenial hernia, and, by adhesions and connexions of the parts within, the entrance into it from the abdomen should be totally closed, (a case which I have twice seen,) the tightness of the tumor, the difficulty of distinguishing the testicle, and the fluctuation of the fluid, may occasion it to be mistaken for a common hydrocele; and if, without attending to other circumstances, but trusting merely to the feel and look of the scrotum, a puncture be hastily made, it may create a great deal of trouble, and possibly do fatal mischief.

By what has fallen within my observation, I am inclined to believe that the sac of a congenial hernia is very seldom, if ever, distended to the degree which a common hernial sac often is: it also, from being less dilated, and rather more confined by the upper part of the spermatic process, generally preserves a pyriform kind of figure, and, for the same reason, is also generally thinner, and will therefore require more attention and dexterity in an operator when he is to open it. To which I believe I may add, that common ruptures, or those in a common sac, are generally gradually formed; that is, they are first inguinal, and by degrees become scrotal: but the congenial are seldom, if ever, remembered by the patient to have been in the groin only.

SECT. XI.

EXOMPHALOS.

The Exomphalos, or Umbilical rupture, is so called from its situation, and has, like the other, for its general contents, a portion of intestine, or omentum, or both. In old umbilical ruptures, the quantity of omentum is sometimes very great.

Mr. Ranby says, that he found two ells and a half of intestine in one of these, with about a third part of the stomach, all adhering together.

Mr. Gay and Mr. Nourse found the liver in the sac of an umbilical hernia; and Bohnius says that he did also.

But whatever are the contents, they are originally contained in the sac, formed by the protrusion of the peritoneum.

In recent, and small ruptures, this sac is very visible; but in old, and large ones, it is broken through at the knot of the navel, by the pressure and weight of the contents, and is not always to be distinguished; which is the reason why it has by some been doubted whether this kind of rupture has a hernial sac or not.

Infants are very subject to this disease, in a small degree, from the separation of the funiculus; but in general they either get rid of it as they gather strength, or are easily cured by wearing a proper bandage. It is of still more consequence to get this disorder cured in females, even than in males, that its return, when they are become adult, and pregnant, may be prevented as much as possible; for at this time it often happens, from the too great distention of the belly, or from unguarded motion when the parts are upon the stretch. During gestation it is often very troublesome; but after delivery, if the contents have contracted no adhesion, they will often return, and may be kept in their place by a proper bandage.

If such bandage was always put on in time, and worn constantly, the disease might in general be kept within moderate bounds, and some of the very terrible consequences which often attend it might be prevented. The woman who has the smallest degree of it, and who from her age and situation has reason to expect children after its appearance, should be particularly careful to keep it restrained.

In some the entrance of the sac is large, and the parts easily reducible; in others they are difficult, and in some absolutely irreducible. Of the last kind many have been suspended for years in a proper bag, and have given little or no trouble. They who are afflicted with this disorder, who are advanced in life, and in whom it is large, are generally subject to colics, diarrhœas, and, if the intestinal passage be at all obstructed, to very troublesome vomitings.[b] It therefore behoves such to take care to keep that

[b] On which account they are often supposed to labour under a stricture of the intestine, when they really do not

tube as clean and free as possible, and neither to eat nor drink any thing likely to make any disturbance in that part.

The cure, as proposed by authors, is either radical or palliative.

Celsus, Paulus Ægineta, Albucasis, Aquapendens, Guido, Severinus, Rolandus, and others, mention a radical cure by ligature: Fab. ab Aquapendente proposes, "aut medicamentis aut ferro "umbilicum adurere;" but after having described both methods, he lays them under such restraints, from age, habit, size of the tumor, time of the year, &c. as amounts almost to a prohibition against putting them in practice at all; and it is to be hoped that nobody will attempt to revive them.

The methods by ligature are two; in the one, the skin covering the tumor is to be lifted up with the finger and thumb, or with a small hook to free it from the intestine underneath; and then a ligature is to be made round the basis of the tumor, so strict as to procure a mortification of all that part which is anterior to such ligature. In the other, the skin is to be elevated in the same manner, and a needle armed with a double ligature is to be passed through the basis of the tumor, which is to be tied above and below, or on each side, so tight as to produce the same effect. Previous to the drawing the ligature close, it is advised to make a small incision in the top of the tumor, large enough to pass in the end of the fore-finger, and with it so to depress the intestine or omentum, as to prevent their being engaged in the stricture.

The intention in both these methods is the same; *viz.* by destroying the lax skin covering the top of the tumor, to produce a cicatrix which shall bind so tight as to restrain the parts from any future protrusion.

The objections to either of them are so obvious, that it is hardly necessary to say any thing concerning them; though, in this age of quackery and credulity, I should not wonder to see them revived and practised.

In young subjects, and small herniæ, a bandage worn a proper time generally proves a perfect cure; and in old persons, and large tumors, it is hardly to be supposed that any body can think of any but a palliative one, the hazard of producing a mortification being so great.

But suppose the subject to be young, and the tumor of such size and in such state as to make it unlikely that a bandage would do more than palliate; that the skin covering the tumor is so lax, as to make it improbable that it should ever recover its former state, and lie smooth; and that, when it has been removed, the cicatrix shall bind so tight, as to prevent the future protrusion of any of the contained parts; yet who can tell what may be the consequence of this destruction of parts, and this indilatability of the skin in a state of pregnancy? I mention this, because I have seen very terrible mischief from the bursting of a cicatrix on the navel, during gestation; though the scar was from an abscess, opened by incision, and consequently could not be supposed to be equal, either in size or resistance, to one produced by the fore-mentioned operation.

The umbilical, like the inguinal hernia, becomes the subject of chirurgic operation, when the parts are irreducible by the hand only, and are so bound as to produce bad symptoms. But though I have in the inguinal and scrotal hernia advised the early use of the knife, I cannot press it so much in this; the success of it is very rare, and I should make it the last remedy. Indeed I am much inclined to believe, that the bad symptoms which attend these cases are most frequently owing to disorders in the intestinal canal, and not so often to a stricture made on it at the navel as is supposed. I do not say that the latter does not sometimes happen—it certainly does; but it is often believed to be the case when it is not.

When the operations become necessary, it consists in dividing the skin and hernial sac, in such manner as shall set the intestine free from stricture, and enable the surgeon to return it into the abdomen, if found, and not adherent; but if it be gangrenous, or mortified, the altered part must be removed, and the fæcal discharge be derived through the wound; by which means, some few have preserved their lives, if such state can be called living.

SECT. XII.

VENTRAL HERNIA, &c.

This may appear in almost any point of the fore part of the belly, but is most frequently found in or between the recti muscles.

The portion of intestine, &c. is always contained in a sac, made by the protrusion of the peritoneum. When reduced, it should be kept in its place by bandage; and if attended with stricture, which cannot otherwise be relieved, that stricture must be carefully divided.

The hernia foraminis ovalis I have never seen.[c]

All the parts almost which are contained in the belly or pelvis, are, by the dilation of their connecting membranes, capable of being thrust forth, and of producing swellings, all which are called herniæ.

Ruysch gives an account of an impregnated uterus being found on the outside of the abdominal opening; and so does Hildanus and Sennertus. Ruysch also gives an account of an entire spleen having passed the tendon of the oblique muscle. And I have myself seen the ovaria removed by incision, after they had been some months in the groin.

The urinary bladder is also liable to be thrust forth, from its proper situation, either through the opening in the oblique muscle, like the inguinal hernia, or under Poupart's ligament, in the same manner as the femoral.

This is not a very frequent species of hernia, but does happen, and has as plain and determined a character as any other.

It has been mentioned by Bartholin, T. Dom. Sala, Platerus,

[c] Since Mr. P. wrote this, he informed me that he had seen two cases of this kind, one in a man, another in a woman; in both, the parties suffered great pain when the intestine was protruded, as it frequently was to the size of a hen's egg, but by lying in a horizontal posture, and a gentle pressure being made, it receded. E.

Bonetus, Ruysch, Petit, Mery, Verdier, &c. In one of the histories given by the latter, the urachus, and impervious umbilical artery on the left side, were drawn through the tendon into the scrotum, with the bladder; in another he found four calculi.

Ruysch gives an account of one complicated with a mortified bubonocele. Mr. Petit says he felt several calculi in one, which were afterwards discharged through the urethra.

Bartholin speaks of T. Dom. Sala as the first discoverer of the disease, and quotes a case from him in which the patient had all the symptoms of a stone in his bladder: the stone could never be felt by the *sound*, but was found in the bladder (which had passed into the groin) after death.[d]

As the bladder is only covered in part by the peritoneum, and must insinuate itself between that membrane and the oblique muscle, in order to pass the opening in the tendon, it is plain that the hernia cystica can have no sac; and that, when complicated with a bubonocele, that portion of the bladder which forms the cystic hernia must lie between the intestinal hernia and the spermatic chord; that is, the intestinal hernia must be anterior to the cystic.

A cystic hernia may indeed be the cause of an intestinal one; for when so much of the bladder has passed the ring as to drag in the upper and hinder part of it, the peritoneum which covers that part must follow, and by that means a sac be formed for the reception of a portion of gut or caul. Hence the different situation of the two herniæ in the same subject.

[d] Many years ago a boy, about ten years of age, was shown to Mr. Pott, with a hard incompressible tumor in the upper part of the scrotum on the right side, which gave little pain except when pressed on. To determine positively its nature and contents was certainly a matter of no little difficulty. It however occurred to me that it might be a hernia of the bladder including a stone. Mr. Pott made an incision through the skin and cellular membrane on the upper part of the tumor, which, now being denudated, more plainly appeared to be what I had suspected. Mr. Pott then drew it forward and divided the neck, when a stone of the size of a very large nutmeg was detached covered with the bladder, except at the upper part, which was left bare from the elastic retraction of the bladder. Some urine followed, and continued to come away in smaller and smaller quantities through the opening, till it completely closed, which happened in a few days:—without any adverse symptoms, the boy got perfectly well. The stone with its covering of bladder is now in my possession. E.

While recent, this kind of hernia is easily reducible, and may, like the others, be kept within by a proper bandage; but when it is of any date, or has arrived to any considerable size, the urine cannot be discharged, without lifting up, and compressing the scrotum: the outer surface of the bladder is now become adherent to the cellular membrane, and the patient must be contented with a supensory bag.

In the case of complication with a bubonocele, if the operation becomes necessary, great care must be taken not to open the bladder instead of the sac, to which it will always be found to be posterior. And it may also sometimes by the inattentive be mistaken for a hydrocele, and, by being treated as such, may be the occasion of great or even fatal mischief.

SECT. XIII.

ATTEMPTS TOWARDS A RADICAL CURE.

In the first section of this treatise I have said, that the means used to obtain both a palliative and a radical cure were exactly the same, and the event was dependent on many circumstances, which a surgeon could neither direct nor alter; such as the age of the patient, the date of the hernial sac, the size of the abdominal openings, &c.

They who are unacquainted with the true nature of this disease may possibly be surprised at this assertion, and be thereby induced to believe, what has in all times been so confidently asserted, *viz.* that there are methods and medicines whereby this disease may always be perfectly cured; and that the surgeons, either through indolence will not get information of them, or through obstinacy will not practise them. If either of these charges was true, it must be the latter, for we certainly do know what attempts of this kind have been made; and if any of these means had really deserved the character which has been given of them, had been safely

practicable, or had proved generally successful, I should certainly have spoken of them in their proper place: but this is so far from being the case, that, on the contrary, however they may have been applauded by a few individuals, they have, upon repeated experiment, been found unfit for general practice, being either totally inefficacious, or painfully mischievous. The majority, nay, almost all they who have submitted to, or tried them, have remained uncured of their disease, or have been mutilated or murdered in the attempt.

Several of these methods have indeed the sanction of antiquity, and have been described and even practised by many of the old surgeons: the principal of these, or they which are most worthy of notice, are the *cure by cautery; the cure by caustic; that by castration; the punctum aureum; the royal stitch; and the cure by incision.*

In Avicenna, Albucasis, Paulus Ægineta, Fab. ab Aquapendente, Guido, De Caliaco, Severinus, Theodoric, Rolandus, Serjeant Wiseman, and others, will be found the *cure by cautery*, which is performed as follows:

After a proper time spent in fasting and purging, the patient must be put into an erect posture, and by coughing, or sneezing, is to make the intestine project in the groin as much as possible; when the place and circumference of such projection is to be marked out with ink. Then the patient being laid on his back, the intestine is to be returned fairly into the belly, and a red hot cautery is to be applied according to the extent of the marked line. For this purpose, cauteries of different sizes, shapes, and figures, have been devised; annular, elliptical, circular, like the Greek letter Gamma, &c. The writers who have given an account of this operation, have differed a good deal from each other, not only in the size and figure of the cautery, but in depth of its effect. Some have directed it to be repeated, so as to denude the os pubis; others direct that the skin only be destroyed by the iron, the cellular membrane, sac, periosteum, &c. with repeated escharotic applications. But, in all of them, the exfoliation[e] of the bone is

[e] Albucasis says, "Et scias quod quando tu non consequeris os cum cauterio, non confert operatio tua."

made a necessary part of the process. The eschar and sloughs being separated, and the exfoliation cast off, the patient is ordered to observe an extremely strict regimen, to lie on his back during the cure, and to wear a bandage for some time after, in order to prevent a new descent of the parts, which, notwithstanding all the pain, and all the hazard, the patient had undergone, he was still liable to.

The cure by caustic seems to have succeeded to that by cautery, and is described by most of the same writers, particularly by Guido, Severinus, Lanfranc, Parey, Theodoric, Scultetus, &c.

The patient being laid on his back, and the parts returned into the belly, a piece of caustic is to be applied on the skin, covering the opening in the abdominal tendon, so large as to produce an eschar, about the size of half a crown.

Some suffer this eschar to separate, others divide it, and then, by the repeated applications of escharotics, destroy the membrana cellularis, with as much of the hernial sac as can be done without injuring the spermatic vessels. For this purpose, different kinds of corrosive applications have been made use of: pastes loaded with sublimate or arsenic; the stirpes brassicæ, burnt; the tithymalus; the lapis infernalis alone, or with suet and opium; oil of vitriol; with many others, according to the humour of the operator. But, though the means are somewhat different from each other, the end or intention in the use of them all is the same, *viz.* to remove or destroy the skin and cellular membrane covering the tumor, together with a part of the hernial sac, and by that means to procure such an incarnation, as, by its firmness, and its attachment to the bone and parts adjacent, shall prevent a new descent of either gut or caul.

The mere relation of one of these methods is sufficient to shock any humane or ingenuous man. The horror attending the use of the cautery must be great, to say nothing of the extreme uncertainty of the size or depth of the eschar: the apprehension from

Rolandus orders the cautery to be used in the same manner; so do Guido, Theodoric, &c.

Brunus says, "Si non fuerit os consecutum, in primâ vice, tunc itera cauterium vice aliâ donec consequeris; quia si non consecutum fuerit os, cum cauterio, parum confert operatio tua."

the caustic will be less, indeed, but the pain must be nearly as great, and of much longer duration.

The parts to be destroyed are, as I have just said, the skin, the membrana adiposa, part of the hernial sac and, the periosteum covering the os pubis; and this is to be accomplished without injuring the spermatic vessels, or the tendon of the abdominal muscle.

If the spermatic vessels are hurt, an inflamed or diseased testicle will be the consequence: if they are destroyed, the testicle will become useless. If the tendon of the oblique muscle be injured, either by the iron, or by the caustic, terrible sloughs, a large ill-conditioned sore, and a brisk symptomatic fever, must be expected, which in some habits must be productive of considerable mischief: and that considerable mischief was often done by these processes, may be learned from the very writers who describe them.[f]

If the os pubis be laid bare, whether by cautery or by caustic, some of the before mentioned hazards must be incurred; if it be not, the intention will in general be frustrated; that is, the intestine will slip down behind the scar, and put the patient under the same

[f] Guido, speaking of the cure by caustic, says, "In quo summe cavendum "est, quod dominus sit de corrosivo; si enim indocte applicatur, febrim "commovet, et accidentia mala." That great pain, defluxion on the hæmorrhoidal vessels, and inflammation and swelling of the scrotum, were often the consequence of these attempts, may be learned from the same author, who, speaking of the method of applying the caustic, says, "Et ita continue "fiat quousque caro miracis tota sit corrupta, usque ad Didymum, quod cog-"noscitur per inflationem bursæ, et testiculorum." And that the caustic has gone deep enough, he gives the following proof: "Quod cognoscetur "per majorem tumorem testiculi et per majorem dolorem dorsi et partium "posteriorum." Brunus says, "Et cave summâ diligentiâ, ne in horâ caute-"rizationis exeat intestinum, et comburatur." Lanfranc, speaking of the ill effect of the caustic in some habits, says, "Et sic multi spasmantur, et spas-"mati subito moriuntur." Fab. ab Aquapendente says, "Quæ tamen chirur-"giæ uti videtis, difficiles admodum sunt, et inter subtilissimas haberi pos-"sunt; quo fit ut plerique patientes affectus perpetuo gestare quam his "chirurgis submittere se vellent." And in another place, "Quæ porro chi-"rurgiæ vehementem dolorem afferunt et satis difficiles sunt. In short, whoever will take the trouble of reading the old writers on this subject, will, even from their own account, be satisfied, of the pain, hazard, and inefficacy of all these methods.

necessity of wearing a bandage, as he lay under before he submitted to so painful and so hazardous an experiment.

If the preservation of life was the object of these means, something might be said in their vindication; the anceps remedium must for ever be preferable to desperation: but that is not the case: they are recommended to be put in practice, when the patient's life is in no kind of danger, and are designed merely to save him the trouble of wearing a truss, which purpose they can seldom answer; for it is well known, that after the use of the cautery, caustic, and every method, either proposed for a radical cure, or used to rescue a ruptured patient from death, that the intestine will slip down behind the cicatrix, and form a new bubonocele, which can only be kept up by a proper bandage.

The three other means made use of by the ancients toward obtaining a radical cure were, the punctum aureum, the royal stitch, and castration.

The punctum aureum was performed as follows:—The intestines being emptied by purging and the hernia reduced, an incision was made through the skin and membrana adiposa, down to the spermatic process. This incision was to be of such length, as to permit the operator, either with his finger or with a hook, to take the said process, and to pass a golden wire under it; which wire was to be twisted in such a manner as to prevent the intestine from slipping down again into the hernial sac, but not so tight as to intercept or obstruct the circulation of the blood to the testicle. Some operators preferred a leaden wire to a golden one, and others a silken ligature.

It may possibly seem rather uncivil to say, that both this and the succeeding operation were directed and practised by people who were very little acquainted with the true nature and structure of the parts they operated upon, or indeed of the disease for which they prescribed such operation: but had not that been the case, they never could have proposed so fallacious and uncertain a method of treating it; for if the wire or whatever was passed round the process did not bind pretty tight, it would not prevent a descent of the gut; and the whole operation, though painful and irksome, must become absolutely useless: if it did bind tight, it must necessarily retard and obstruct the circulation of the blood

through the spermatic vessels, and produce a disease of them, and of the testicle.[g]

The royal stitch was performed in this manner: the intestines being emptied, and the portion which had descended being replaced, an incision was made in such manner as to lay bare the spermatic chord, about two inches in length from the abdominal opening downward. When the process was freed from the cellular membrane, it was to be held up by an assistant, while the surgeon with a needle and ligature made a continued suture, from the lower part of the incision to the upper, in such manner as to unite the divided lips of the wound again, comprehending the cellular membrane, and thereby endeavouring to straighten the passage, as they called it, from the belly into the scrotum, without injuring the spermatic vessels.

The operation is described by many of the old writers,[h] with some small variation from each other, both in the manner and in the instruments; but all tending to the same end, and all proving that their ideas of the disease, and of the parts affected by it, were erroneous and imperfect.

The fatigue to the patient must be greater in this than in the preceding operation, both on account of the large incision, and of the suture.

In some habits, either of them must be very hazardous, and in the majority of cases, painful, troublesome, and tedious; which circumstances might nevertheless be submitted to, if the cure was certain, the contrary to which did most frequently happen, even by the confession of the very writers who propose and describe these methods, and who universally order the long wearing a truss after such operations have been submitted to.

Some, who thought that the stitch added unnecessarily to the pain, have directed the incision to be made in the same manner as for the suture; but, instead of sewing the lips together, have advised that the common membrane be dissected out pretty clean,

[g] Whoever would know the particular methods of executing this operation, may find them in Guido, Parey, Franco, Scultetus, Smaltzius, Permannus, Nuck, &c.

[h] Paulus, Albucasis, Fab. ab Aquapendente, Guido, Rolandus, Parey, Serjeant Wiseman, &c. &c. &c.

and the sore digested and incarned. This is so like to the operation for the incarcerated bubonocele, both in the manner of making the incision and in its consequence, as tending toward a radical cure, that it may be looked upon as really the same thing; and how very fallacious and uncertain that operation proves toward answering this end is too well known.

Both these, the *royal stitch* and the *punctum aureum*, proved often destructive to the testicle, even in the most judicious hands; and when it got into those of ignorant pretenders, it proved most frequently so; for not knowing how to perform properly what they had undertaken, and finding it much more easy, after the incision was made, to slip out the testicle, they most commonly did so.

These are the principal methods proposed or practised by our forefathers for a radical cure of a rupture: among the writers indeed will be found some trifling variations from each other in the execution of them, but the intention and aim are the same in all, *viz.* to prevent a new descent of either gut or caul, by producing an union of the parts, through which they either did or were supposed to pass. According to the degree of anatomical knowledge, and humanity of the proposer, they will be found to be more or less rational and gentle; but are all of them painful, hazardous, and most frequently fallacious, and have therefore been totally disused by all modern practitioners, who have either knowledge, compassion, or honesty.

No disease has ever furnished such a constant succession of quacks as ruptures have: they who have had some smattering of anatomy or surgery, and whose humanity has not been their prevailing quality, have adopted one of the preceding operations, or something like them; while they who have had less knowledge, and more timidity, have had recourse to the more sneaking knavery of specific applications.

The histories of prior Cabriere, Bowles, Sir Thomas Renton, Dr. Little John, &c. &c. &c. to be found in Dionis, Houston, and other writers, will furnish to the reader an idea of the practice and performances of some of those who stood at the head of those bold promisers: and our present newspapers daily supply us with a number of the lesser dealers in specific medicines, and new-invented bandages, by which the poor and credulous are gulled out

of what little money they can spare. Operative quackery is not indeed so frequent, or so readily submitted to; but I wish I could say that not more than one life has been destroyed in our own time, by attempts to form and support the character of an operator in this disease: to this kind of hazard indeed the poor are luckily not so liable, as it can only be worth the while of these rupture-doctors to murder those who have before-hand been simple enough to pay them well for it.

This is a subject in which mankind are much interested, and on which a good deal might he said; but as an honest attempt to save the afflicted from the hands of those who have no character to lose, and whose only point is money, might, from one of the profession, be misconstrued into malevolence and craft, I will not enter into it, but shall conclude by wishing, that they who have capacity to judge of these matters (which are as much the objects of common sense, as any other kind of knowledge) would not suffer themselves to be deluded by the impudent assertions of any charlatan whatever, but determine in this, as they do in many other things; that is, by the event. In short, if they who have so much credulity, as to be inclined to believe and trust these lying impostors, would only defer the payment of them till they had completed their promises, the fallacy would soon be at an end.

*** The foregoing Treatise on Herniæ must be allowed to be written with that lucid arrangement and perspicuity which distinguish the other productions from the pen of Mr. Pott. It is indeed a performance of extraordinary merit for the time in which it was published; but, as science is progressive, it is not to be wondered at, if modern practitioners are enabled to discover in it some inaccuracies. It has particularly been remarked, that, in page 306, Mr. Pott has asserted that the external oblique muscle is the only one which has a ring or opening in its tendinous fascia: that "all descriptions and delineations of more openings than that single one, on each side, are not representations of nature, but are images of luxuriant fancy, and have no foundation in truth." Since this was written, the opportunities of studying anatomy

have been much facilitated and extended, and from more accurate examination this description has been found to be not quite correct. Among the laborious and accurate investigators of modern times, Mr. Cooper holds a distinguished rank. To the subject of Herniæ he has paid particular attention; and, in the plates which he has given of the parts concerned, he has plainly delineated and demonstrated a ring formed by the fascia of the transversalis muscle. This is certainly an important fact, which ought to be well known and understood, as whoever proceeds to perform the operation for an incarcerated hernia, with a confidence that the ring of the external oblique can alone prevent the return of the contents of the sac, may find himself much embarrassed at meeting with another stricture, which undoubtedly is sometimes caused by the internal ring.

Mr. Lawrence also has lately published an excellent practical Treatise on Herniæ, which gained the Jacksonian prize from the Royal College of Surgeons, and in which this subject is accurately investigated.

I must also observe on another passage, in page 362, in which Mr. Pott has very properly deprecated the idea of tying the omentum by including the whole of it in a ligature; but though this may be productive of the mischiefs he has enumerated, surely it would be right to secure such vessels as are likely to bleed before the omentum is returned into the abdomen. Those vessels in some subjects are naturally large: by disease they sometimes become larger; and cannot, I conceive, be safely trusted without the security of ligatures. If they are tied singly and separately, the bad consequences which Mr. Pott has described would be avoided. E.

THE FOLLOWING

OBSERVATIONS AND CASES

RELATIVE TO

RUPTURES, &c.

Were written long after the preceding; and in former editions were inserted in a different part of the Work: but being a continuation of the same subject, they appear more properly introduced in this place.

SECT. I.

DISEASES OF THE OMENTUM, PARTICULARLY OMENTAL HERNIÆ.

THE general doctrine regarding these is, that, although they are sometimes troublesome from their weight and size, yet the omentum being insensible, and very little, if at all necessary to vitality, they do not call for our immediate assistance, and never endanger the patient's life.

That omental ruptures are not attended with those immediately hazardous circumstances, which necessarily accompany intestinal ones, is a truth beyond all doubt; but that diseases of the omentum are of little consequence, or that this kind of rupture is so harmless, as never to bring the life of the patient into danger, and to prove positively as well as eventually fatal, is a position which is by no means true.

Intestinal ruptures are primarily and originally hazardous; and this hazard arises as well from the structure, as from the func-

tions of the parts concerned. The tender membranes of the intestines are very little able to bear any considerable degree of inflammation; and neither digestion of the food, propulsion of the chyle into and through the lacteals, nor expulsion of the fæces from the large guts, (offices absolutely necessary to the very existence of the animal,) can be executed, while such stricture is made on any part of the intestinal canal as either hinders its natural motion, or renders its tube impervious; consequently, whenever this happens, from whatever cause, the patient is immediately disordered, and brought into a state of hazard.

The omentum is not indeed so liable to injury, either from its structure, or from its office: the dislodgement of it from its natural situation within the belly, or its engagement in a stricture, seldom produces any immediate or very pressing symptoms; and therefore its confinement within a hernial sac has seldom been regarded as a matter of importance. Taken in a general sense, it certainly is not. The displacement of a mere portion of caul from its natural situation, and the detention of it in the groin or scrotum, will not, in general, occasion any such interruption in any of the functions of the animal, or so disorder its internal economy, as to produce a considerable degree of pain or hazard: but whoever from thence concludes that omental ruptures are absolutely void of danger, will find himself much deceived. A more attentive observation of the disease, and of its effects, will inform him, that very considerable mischief sometimes attends them, and that the ill consequences of neglect or mismanagement, though perhaps less frequent and less rapid, are not less real.

The ills which may attend omental herniæ are of two kinds: one of which is primary or original, proceeds from the part which first formed the rupture, and is confined to it independent of any other; the other is secondary, or an accidental consequence, flowing indeed from the same original malady, but affecting other parts also.

The omentum is liable to inflammation, suppuration, gangrene, mortification, and scirrhus, while in its natural situation within the cavity of the belly; and each of these states is often the real, though most commonly unsuspected, cause of very alarming symptoms, and not infrequently of death.

It is not only liable to the same morbid alterations, when thrust forth from the cavity into a hernial sac, but the neglect or mismanagement of it, when there, is productive of these and other evils, which, for want of a proper attention, have either been totally overlooked, or set to the account of other causes. Violent or continued pressure on it has produced inflammation with all its consequences; has brought on fever of a very bad kind, suppuration, slough, and sphacelus; long confinement of it within a hernial sac has occasioned such other alteration in its form and texture as to render it truly a diseased body, and to produce many inconveniences from such its morbid state; and an undue or interrupted circulation through it, by means of stricture, occasions, sometimes, such a collection of extravasated fluid in the sac, as to render it a necessary object of a surgeon's attention; not to mention that the dragging down a larger portion of the caul into the scrotum, proves sometimes more than merely disagreeable, by reason of its connexion with the abdominal viscera.

These are ills which arise from omental ruptures primarily, and are dependent upon the nature of the disease, considered abstractedly, without any view to or connexion with any other. But there is another, which, although it may be called secondary, or be considered as a consequence, is both frequent and hazardous.

When a portion of the peritoneum, forming a hernial sac, has been thrust quite down into the scrotum, I believe I may venture to affirm, (notwithstanding what may have been said to the contrary,) that it seldom or never returns back into the abdomen again, but becomes immediately, and wholly, connected with the cellular membrane investing the spermatic vessels; so that whoever has once had such sac so protruded can never have any security against the disease called a rupture, but what is derived from such means as may render the entrance into that bag too small to permit any thing to pass from one cavity into the other. Upon this principle, and on this only, stands the utility, and indeed the necessity, of trusses and such kinds of bandages. By these, in infants, and in young subjects, such a coarctation or lessening of the entrance into the sac is produced, that a firm and permanent cure is often obtained; but in the majority of adults,

and in all people far advanced in life, such effect is not to be expected. It does indeed happen to some few, but it is to be regarded as an accidental benefit; and the bandage being the only means whereby a descent can be prevented, it ought to be constantly and unremittingly worn.

Whoever has a just idea of an hernial sac must be convinced, that while a body, or substance of any kind, possesses that part of it which communicates immediately with the belly, such passage can never be closed: and, consequently, that the one point, in which even the palliative cure of a rupture consists, can never be accomplished.

A portion of omentum, although it be compressible, soft, and slippery, will, while it remains in such passage, keep it as constantly and as certainly open, as any other body whatever; and from the very circumstances of its being soft, slippery, and compressible, will still more easily let any other body pass by it: a portion of the intestinal canal is frequently pressed against the mouth of this sac, and that with considerable force. The orifice being open, and the omentum affording but little resistance, the said portion is often pushed into the bag; and by this means a new, and still more interesting and hazardous complaint, is added to the old one.

This happens much more frequently than it is supposed to do; and is, in the nature of things, so probable, that no person who has an omental rupture can, for any the shortest space of time, be said to be secure against the descent of a portion of intestine; and consequently is always liable to every kind and degree of hazard attending an intestinal one.

CASE I.

A GENTLEMAN, about forty-three years old, had, for some time, been subject to a rupture of the omental kind, which came down when he was in an erect posture, and went up with great ease when he lay supine.

I reduced it, and put on him a truss, which answered the pur-

pose very well, by keeping the rupture up all the while it was worn: but the patient, disliking the necessary degree of pressure, and finding very little inconvenience from his disease, (it being merely a piece of caul,) laid aside the use of his bandage, and suffered his rupture to take its own course.

Being obliged to take a long journey on horseback, and being apprehensive that his complaint might, by exercise in hot weather, prove troublesome, he had a mind to put his truss on again, not doubting but that he could replace his rupture as easily as he had been accustomed to do: he tried several times, but could not accomplish it. He came to me; I tried, and was foiled. I repeated the attempt again and again, but to no purpose, still being clear that the disease consisted only of a portion of omentum, and that not large.

From me he went to one of the advertisers; who having, for a day or two, amused him with anointing his groin, put on him a bandage with a large, hard bolster; which being buckled very tight, he was permitted to begin his journey, and was told that, long before he returned, the portion of caul would be shrunk to nothing, and his disease thereby cured. He set out, and got about twenty miles, when he found himself so ill, and in so much pain, that he determined to come back to London; which he accomplished with great difficulty.

I found him in extreme pain all over his belly, which would hardly bear being touched; he was incapable not only of sitting or standing upright, but even of lying straight upon his back; he could hardly bear the weight of the bed-clothes; and the most gentle pressure, toward the bottom of his belly, and his groin, was intolerable. The scrotum, and spermatic process, on the ruptured side, were swollen, tense, and inflamed; his skin was hot and dry, his pulse hard and frequent, and he had such a degree of restlessness, that, although motion was very painful to him, yet he could not lie still for two minutes.

Notwithstanding the many opportunities which, before this accident, I had had of knowing the true nature of his rupture, and that I was perfectly convinced that it had always been omental merely, yet from his acute pain, from the enlarged and inflamed state of the process, and from the nature and rapidity of his symp-

toms, I was much inclined to believe, that a portion of intestine had some share in the present mischief; but the patient, who was a very intelligent man, insisted on it that it had not, and that all his present malady was caused by the pressure of the truss on the omentum.

I took away a considerable quantity of blood, and, notwithstanding the patient's opinion, directed a solution of the sal rupell. in infus. sennæ to be taken immediately, and a purging clyster to be thrown up as soon as it could be got ready; for the parts were in such a state, that, had there been more convincing marks of intestinal stricture, reduction by the hand was at that time impracticable, and unfit to be attempted. I saw him in about six or eight hours. The discharge per anum had been such as to put an end to all suspicion of stricture on any part of the intestinal tube, but his inflammatory symptoms were not at all lessened. I took away more blood, and would fain have put him into a semicupium, but the dread of motion prevented him from complying with it. His pain was excessive; and as he had now lost a very considerable quantity of blood, and had had a very free discharge by stool, I threw up a clyster of warm water, oil, and laudanum, and gave him two grains of extract. thebaic. by the mouth. He passed so bad a night, that he was glad, early in the morning, to comply with the use of the bathing tub, by the repeated use of which, and taking care to keep the body open, by lenient, oily remedies, he, at the end of four days, got to be easy.

Fomentation and poultice reduced the tumefaction in the groin and scrotum; and when they were removed, the rupture appeared to be nearly in the same state as before the accident, oily a little larger.

Two years after this he died, and was opened; his rupture was found to be merely omental, and the portion of caul which formed it was, in its inferior part, adherent to the hernial sac in two places.

CASE II.

A YOUNG man, who worked as a journeyman with a silversmith in Foster-lane, came to me three or four different times, on account of a rupture, which appeared to have every mark of being merely omental.

It was large, and had, as he said, been for some years easily reducible; but it was not at all so at his last visit to me. By a late increase of size and weight, it was become very troublesome, as well as very visible. Finding reduction impracticable, I recommended to him the use of a suspensory bandage, and gave him directions for his general conduct.

At the distance of about six months from his last visit, I was sent for to St. Bartholomew's hospital in a hurry, to a person supposed to labour under a hernia with stricture.

I found a man who was only not dead; he had a dying countenance, a faltering pulse, a constant hiccough, and cold extremities.

As it did not appear to me that it was possible for me to do him any service, I was going away, but was called back at the patient's particular request. He made himself known to me to be the person I have just mentioned; and a friend who was with him, gave me the following account:—

That a few days before, having an intention to marry, and believing that his rupture would be prejudicial to him, he had applied to somebody who had been recommended to him for relief; that the person to whom he applied, having received from him such gratuity as he could afford at that time, in part of payment, had promised to cure him within a month; that he anointed him for two or three days with an ointment, and then put on him a very strict bandage; that he was ordered to wear this bandage constantly, day and night; that when he had worn it three days, not being able longer to endure the pain it caused, he took it off, and went to his surgeon, who seemed to be surprized, and bad him go home, apply to his groin and scrotum a poultice made of boiled turnips and hog's-lard, and come to him again the next

day; that the inflammation and swelling increasing, he was prevented from fulfilling the last injunction, and therefore sent for his operator, who came to him, examined the parts, said he had got the pox, and refused to do any thing more for him without the deposit of another five guineas; and that not being able to comply with this demand, his friends had brought him to the hospital.

The scrotum had been of considerable size, but was now subsided; it had been very painful, but was now easy; it was in many places livid; and, upon handling, the fingers perceived that alarming crepitus, which infallibly denotes putrid air from gangrenous membranes.

When I saw him in health, I was perfectly satisfied, that his rupture was merely omental; I was as much satisfied, that his present state was owing to his bandage; but nevertheless I cannot but say, that I suspected a piece of intestine to have slipped down, and to have occasioned this fatality by being pressed on.

I inquired into his discharge by stool, and was told, that he had a large one within the last two days, but having often experienced how liable people are to deception in these cases, I did not give entire credit to the account.

That evening he died, and next morning he was opened.

The scrotum and hernial sac were completely mortified, and within the latter was a small quantity of a most exceedingly offensive sanies, together with a large piece of sphacelated omentum only. The whole intestinal tube was within the belly perfectly sound, and in good order; but the omentum within that cavity had partaken considerably of the mischief done to that part of it which was in the hernial sac, and was gangrenous throughout.

CASE III.

I was desired to visit a gentleman at Hackney, who had for some years been afflicted with a rupture, which at different times had been examined by Mr. Sainthill, Mr. Samuel Sharpe, and others; and had, by every body, been deemed to be merely omental. For some years it had been kept up by means of a steel

truss; but a few months before I saw him he had laid aside his truss, and had put on a dimity bandage, with a large bolster, which he had worn very tightly buckled. How he had managed himself in other respects, I know not; but I found him with his groin and scrotum much swollen, and very painful to the touch; he was hot and feverish, and had been two days without a stool. The state of the parts was such, that an immediate attempt to reduce the rupture by the hand was impracticable, at least could not have been attended with any probability of success. He was immediately let blood, had a clyster, and an aperient draught. Next day I found him worse, in more pain, with more inflammation, and a greater degree of tumefaction, and had not yet had a stool. I was obliged to depend on the patient's own account of his case previous to this attack. He insisted on it, that his rupture had never been intestinal, and that every body who had seen it had given him that assurance. This I could not contradict, but was, at the same time, much inclined to believe, that a portion of intestine was down now. The cataplasm was applied over the whole scrotum and groin, a stimulating clyster again thrown up, and a purging mixture ordered to be taken, cochleatim, every two hours, until he should have stools, but all to no purpose.

On the third day he was worse in every respect; his belly exceedingly tense, his pain great, his restlessness fatiguing, and he felt not the least tendency towards a discharge per anum.

I proposed the operation, but the patient and his friends objected. A clyster, of an infusion of tobacco, was administered. This produced such sickness and languor, with cold sweats, &c. as alarmed every body, but produced no stool.

Late in the evening, he submitted to the operation. The parts were now so altered, that I guarded myself with a most doubtful prognostic. I made an incision from the groin to the bottom of the scrotum: the skin, dartos, and hernial sac, were all gangrenous; and from the cavity of the sac I let out a considerable quantity of a most offensive sanies, and with it a large, putrid slough, which appeared to have been a part of the omentum. I examined the opening in the abdominal muscle, and was satisfied that it was in a natural state, and that nothing from the abdomen

was engaged in it. On which account, I did not meddle with it, but having dressed the wound superficially, put on his poultice again. Dr. de la Cour was present at the operation, and directed for the patient. Another day passed without stool, and this I thought must have been his last day; but on the fifth he had a most plentiful discharge, and was thereby relieved from the tension of his belly, and his most troublesome symptoms.

The sore was a long time crude and unkindly, but by means of the bark, and proper diet, all difficulties were surmounted, and the patient got well.

Had a piece of intestine been in the sac, it must, I think, have necessarily partaken of the state in which both it and the omentum were; and although the patient might possibly have survived, yet a discharge of fæces through the wound must, at least for a time, have been the consequence; but here was nothing of that kind, nor any reason, after the constipation was removed, to suppose that the intestine had ever sustained any injury, or had any share in the complaint.

CASE IV.

A MAN, about fifty-five years old, asked my opinion concerning a hard swelling, which he had on each side, both in the groin and scrotum.

To the eye they appeared like omental herniæ; but upon examination, they were not only unequal in their surface, but craggy, and incompressibly hard.

The patient said, that at the time of handling them they gave him very little uneasiness, but that such handling always made them painful for some time after: that he was, at times, attacked with acute pain darting through his belly, up into his loins; and that such attack was frequently attended with a nausea, and an inclination to vomit; that he had been subject to a painful colic, attended generally with constipation of belly; that an erect posture, if continued for any length of time, was very irksome; that these swellings were for several years soft, and easily returnable into the belly; that while they were so, he had, by the advice of

Mr. Samuel Sharpe, worn a steel truss; but that being engaged in a bustling active kind of life, and the truss not always doing its duty, he had left it off for some years. That for the last two years he had never been able to return either of them, since which they had altered very much; that in their present state he had consulted several of the profession, and some quacks; that by some they had been deemed scirrhous testicles; by others, scirrhi of the spermatic processes; that he had gone through a course of mercurial inunction; had taken freely of the solution of sublimate cu. de coct. rad. sarsaparillæ, and had (in his own phrase) swallowed a wheel-barrow-full of cicuta; that he had been promised a cure by having them laid open, to which he had submitted, had not the operator been too lavish in his promises, and too exorbitant in his demands; and that frequent attempts had been made to soften them by fomentation, poultice, &c. but all to no purpose.

He had a sallow complexion, a languid fatigued look, a weak irregular pulse, too much heat and thirst, and too little urine: upon the whole, he seemed a very improper subject for any chirurgic treatment, if any could have been rationally proposed; but as it did not appear to me that any thing of that kind could be done for him, I advised him to keep his scrotum suspended, and to consult a physician on account of his general state.

Not long after, his legs swelled, he lost his appetite, and his urinary secretion almost totally ceased. The consequence of which was, a general anasarca, and death.

In each groin, and on each side in the scrotum, was a hernial sac, bearing all the marks of antiquity: in each of these was a hard, knotty, irregular kind of body, whose surface was covered with varicous vessels.

These bodies passed from the cavity of the belly, through the opening in the abdominal muscle, were continuations from the omentum, and were truly cancerous.

CASE V.

That the residence of a portion of omentum in an open hernial sac, must render the patient constantly liable to the descent of a

portion of intestine, is so self-evident, that it cannot admit the smallest doubt; but the following case being rather remarkable I have inserted it.

A drunken idle fellow, who lived in the neighbourhood of St. Bartholomew's, used to come frequently to the surgery for pledgets for broken heads, &c. He had also a small omental hernia, as fairly and decisively characterised as possible. Myself, and all the surgeons, had at different times replaced it for him, and the hospital had once or twice given him a truss; but, being much oftener drunk than sober, he seldom wore it at all, and when he did, it was seldom in the right place.

One day while I was at the hospital, he was brought in with an immense swelling of the scrotum, and all the symptoms of a hernia with stricture, and those so far advanced, that he had no chance but from the operation, which I therefore performed immediately.

In the sac was a considerable portion of the ileum, and a large piece of the colon, with the appendicula vermiformis, together with the small piece of omentum, which had constituted the original rupture. The parts were mortified, and the man died.

Unless it can be supposed, that so large a quantity of intestine could, by every body, be mistaken for a small one of omentum only, it must be clear that the residence of that small piece of omentum gave the opportunity for the formation of the intestinal hernia, and cost the poor man his life; more especially if it be noted, that the increase of tumefaction and attack of bad symptoms were the immediate consequence of an exertion of strength.

CASE VI.

While I was correcting these papers for the press, I was desired to go down to St. Katharine's to see a patient, who was supposed to be afflicted with an incarcerated hernia.

I found a man between sixty and seventy, whose scrotum was large and full, and, as I thought, contained both omentum and intestine.

It was the third day since he had had a stool, although gentle

cathartics had been given each day. His pulse was rather full, but otherwise not much amiss; he had now and then an inclination to vomit, and his belly was very tense; but, on the other hand, he had neither the sensation of general or local pain, either upon being examined, or put into motion, which persons labouring under a stricture most commonly have; neither had the spermatic process the feel which it usually has in such cases.

I could not say that I thought him in immediate hazard, although the irreducibility of his rupture, and the length of time which had passed since he had a stool, were certainly unfavourable circumstances. I directed a tobacco clyster to be given immediately, and five grains of extractum catharticum to be taken, alternis horis, until he should have a stool. The clyster was administered and repeated, and the pills were taken, and I visited the patient early the next morning.

He had not had any discharge per anum, his belly was become much more tense, and I thought him upon the whole so much worse, that I proposed the operation, and the patient submitted to it.

In the hernial sac was a large piece of omentum, or rather of what had been omentum, but which was now hardened into a large flat cake, as incompressible as cold bees'-wax, and about the size of a large mangoe: it distended all the upper part of the sac, and was adherent to the lower part of it. Behind this large body lay a portion of the intestinum ileum; and, below this, that part of the colon which is annexed to it: the colon was considerably distended with flatus; and the ileum was so wedged in and pressed, by the altered omentum, that nothing could possibly pass through it. When the portion of omentum was removed, the tendon made so little stricture on the gut, that, had it not been for the great distention of the colon, it might have been returned into the belly without division.

In short the constipation of belly, and mischief proceeding from thence, seemed to arise entirely from compression made by the hardened omentum, and not from a stricture.

In my general treatise on ruptures, I have ventured to dissent from the commonly received doctrine concerning the propriety of tying the omentum previous to its extirpation, when it may be found necessary to remove a part of it; and have said, that I thought it not only unnecessary, but pernicious.

Perhaps I may have conceived an unreasonable prejudice against this practice, and it may not appear to others so hazardous, or so improper, as it does to me; perhaps the cases which follow, and which are some of those that have furnished me with my objections, may not be thought cases in point; and the miscarriages in them may be thought to be deducible from other causes: all I can say is, that it appeared to me, that the patients suffered principally, if not merely, from this cause; and that as I am by repeated experience convinced, that a portion of the omentum, however large, may be extirpated with perfect safety, without being previously tied, I shall never practise or advise the ligature.

CASE VII.

A man, about thirty years old, was taken into St. Bartholomew's hospital for a considerable swelling of the groin or scrotum.

The account he gave of himself was as follows: that he had for several years a rupture, which many surgeons, who had seen it, had deemed to be merely omental; that he had formerly had a truss, but whether from its being ill made, or from his injudicious manner of wearing it, it had never kept his rupture properly up, and he had long disused it; and that the day before he was brought into the hospital, a horse had kicked him in the groin, and brought on that increase of pain and swelling of which he now complained.

It was Mr. Nourse's week for accidents, and he consequently took the care of him. He was let blood, had a clyster, and a poultice was applied.

The next day the swelling was the same, and the man had not

had any stool. A purge was administered, which he ejected by vomit; and another clyster was injected in the evening. On the third day, finding that nothing had passed, Mr. Nourse suspected that the intestine was concerned: he bled the man again largely, and ordered two spoonfuls of a purging mixture to be given every two hours, until he should have stools. That evening he vomited two or three times; and next morning, being still without a stool, Mr. Nourse determined upon the operation.

The hernial sac was sound, thick, and tough, and contained a portion of omentum, and some bloody water. Mr. Nourse and myself both examined the omentum carefully, upon a supposition that we should find some intestine within it. It was perfectly sound, but its vessels were considerably dilated: there was no intestine, nor did the tendon bind upon the omentum. As there was no gut down, and as the portion of caul was now too large to repass the ring, Mr. Nourse made a strict ligature on it, just on this side, and cut it off.

Soon after the operation, the man had stools; but during that night got little or no sleep, and complained of much pain. The next day he was worse, was feverish, complained of great pain about his navel, and that he could not sit or stand upright, but had two loose stools.

On the third day he was still worse; that is, had more fever, complained that his pain in his belly was excessive, and could keep nothing on his stomach. On the fourth day, toward evening, his pain suddenly left him, and early in the morning he died.

Mr. Nourse, who was still apprehensive that the intestinal canal was some way or other concerned in the mischief, desired me to open the body.

The abdominal tendon was sound and unhurt, nor was there any such appearance about the wound as always accompanies mischief proceeding from thence: the intestines were perfectly free from blemish, inflammation, or obstruction, nor was there any appearance of disease of any kind on or about any of the viscera, except the omentum, which was gangrenous through its whole extent.

What share the inflammation of the omentum might have in preventing a free passage through the intestines I know not, nor

to what other cause such obstruction might possibly be owing; but that the omentum was sound, at the time of the operation, and gangrenous when the patient died, is beyond all doubt.

CASE VIII.

A MAN, about forty years old, who had for several years been afflicted with a rupture which had always been deemed to be merely omental, was brought into St. Bartholomew's hospital labouring under all the symptoms of an intestinal hernia, with stricture; and those so pressing, that the operation immediately performed was his only chance.

Upon dividing the sac, a large piece of omentum (which was considerably thickened in its texture, and whose vessels were considerably distended) presented itself. This was carefully expanded, as far as it would admit, and laid first on one side, and then on the other, but no other body discovered. The incision being continued higher up, in order to get at the ring, as it is called, a portion of intestine was discovered; it was so small, as hardly to consist of the whole diameter of the gut, but begirt very tightly. I had, when the intestine was fairly in view, a mind to try whether I could not return it without dividing the tendon, and succeeded in the attempt. When this was done, the consideration was, what to do with the omentum. It was so large, and so affected by stricture, that it could not repass the abdominal tendon without division: as the gut was returned, it seemed a pity to divide the tendon merely on account of the caul: it was therefore determined to tie it, and cut it off.

The man had a plentiful stool in an hour after the operation, but toward evening, and during the night, was much out of order. Next morning he was hot and restless, had a frequent and full pulse, complained of great pain about his navel, and all over his belly, which was much too tense, and he was now and then very sick.

Blood was drawn from him freely; he had an oily laxative clyster; and Dr. Pitcairn directed for him. On the third day, all

his febrile symptoms, and his pain, were much exasperated, notwithstanding he had three or four stools.

I think I may venture to say, that both the physician and myself did every thing in our power for him; but on the fourth evening he died.

As the case had given me some concern, upon a supposition that the man might have had a better chance, had the tendon been divided for the return of the gut, I opened him as soon as I had notice of his death. I examined the whole intestinal canal, and found it free from blemish: the peritoneum was unaltered; but all that was left of the omentum was gangrenous.

CASE IX.

A MAN, about thirty-six years old, was a patient in St. Bartholomew's for a sore leg. While he was there, he desired me to look at a rupture, which he had long had, and which was clearly omental and irreducible.

When his leg was well, he desired me to cut him, as he called it; alleging, that his rupture was so troublesome, that it prevented him from following his business. I refused it, and directed him to wear a suspensory bag.

He solicited me again and again, and at last, overcome by his importunity, I performed the operation. The sac was thin, and the piece of omentum not large, nor at all altered, nor was there any thing else in the bag: I made a ligature, and cut it off without meddling with the tendon. From the time of the operation he was in constant pain all over his belly.

Bleeding, laxative medicines, clysters, &c. were administered, but to no purpose. On the fourth day he died, and had no appearance of mischief about him, except a highly inflamed omentum.

INTESTINAL HERNIÆ.

WHEN a portion of intestine, which has passed out from the cavity of the abdomen through the opening in the oblique muscle,

is so begirt as not to be capable of executing its proper office, the person, to whom this happens, may be said to be in immediate danger.

The general offices of the intestinal tube are, digestion of the food, formation of chyle, impulsion of it into the lacteals, and expulsion of the fæces forth from the body. If these so necessary functions are, for any considerable time, suspended or prevented, the consequence is too obvious to need mentioning: fortunately for mankind, this cannot happen unknown to us. Whenever such stricture is made, symptoms and complaints arise which warn us of our danger: pain, tumefaction, and incapacity of going to stool, are the first and most immediate effects. If the case be neglected, or no proper remedy used, inflammation, fever, sickness, and vomiting, soon follow; and these are often, in a short space of time, succeeded by hiccough, gangrene, and mortification. Whoever considers what the first of these are indications of, and knows what will inevitably be the consequence if they be not obviated, must be sensible, that the very slightest attack of this kind ought to put us on our guard, and excite us to use our utmost endeavours to prevent further mischief. How long the first and seemingly slightest symptoms may continue before material injury be done, no man can pretend to say: this must depend upon a variety of circumstances, and will be different in different cases; but as no man can be duly and intimately acquainted with these circumstances, and as the change from the most slight to the most hazardous is sometimes very rapid, no one can be vindicated in suffering the smallest portion of time to be lost by waiting a few hours.

The first thing to be done is to attempt the reduction of the intestine: if this fails, our next endeavour must be to relieve the symptoms, and thereby remove the obstruction to such reduction.

The means prescribed for this purpose are, phlebotomy, clysters, cathartics, a semicupium or warm bath, fomentation, embrocation, and cataplasm; and these, by the generality of our writers of systems and institutes, are ordered indiscriminately, as if their efficacy were nearly equal, and it was a matter of indifference which a practitioner made use of. This I cannot conceive to be true: some of them are really useful; but others, as far as my

experience goes, of little or no use at all. Among the former, I reckon phlebotomy, cathartic medicines, clysters, and the warm bath; among the latter, embrocation, fomentation, and poultice. The former have saved many a life: from the latter, I never saw any material benefit, though I have often and often tried them; and I am much inclined to believe, that the use of them has cost many a person dear, by occasioning a loss of that time which ought to have been otherwise employed. The inflammation and distention of the intestine can never be removed while it is begirt by the tendon of the abdominal muscle; whatever may be the original cause of the stricture, the effect must be the same; the tendon lies out of the reach or influence of a greasy poultice; the external skin may indeed be relaxed by it, and some small part of the uneasiness may thereby be relieved; but this is of no importance toward appeasing the symptoms, lessening the hazard, or affording a remedy for the original evil. The mere relaxation of the skin will not affect the stricture made by the tendon, the warmth of the poultice will increase the distention, and the intestine will become gangrenous, notwithstanding a small part of the external inflammation may seem to be appeased.[1]

If the symptoms are neither such, nor so pressing, as to require the chirurgic operation; or if the fears and apprehensions of the patient, or of friends, prevent such operation, however necessary it may be, the most powerful and most efficacious means of obtaining relief are, phlebotomy, warm water, and the exhibition of such medicines as are likely to produce stools: by the first we reduce the strength of the patient, lessen the velocity of the circulating fluids, moderate the febrile heat, and take the chance of a deliquium; by the second we endeavour to relax the tendinous opening by which the intestine is begirt; and by the third, the discharge of fæces, through the intestinal canal, is attempted. The power of the two first is clear and undoubted; but I cannot help thinking, that we are, in some degree, wrong about the last. Cathartic

[1] Cold, discutient applications bid much fairer to retard the hasty progress of the inflammation, than warm ones; and will be found to answer the purpose much better. Such as solutions of sal ammoniac. crud. in vinegar, the sp. mindereri, the acet. lythargirit. and such like.

medicines have, in all times, been prescribed in the case of hernia with stricture; but the true intention, which ought by their means to be aimed at, does not seem to have been, in general, clearly understood: this perhaps is the reason why practitioners and writers disagree so much about the kind of medicines which they think most proper; some advising those which are of the lenient unirritating kind, others prescribing those which are most stimulating: both cannot be right, and therefore it may be worth while to inquire, what should be the point aimed at, and which are the most likely means to accomplish such end.

Is a discharge, per anum, the primary view, and therefore the first object of attention? or is such discharge to be regarded only as a necessary or natural consequence of the removal of the intestine from its prison? If the former be the case, it is clear, that in the circumstances in which such patient must be, stools cannot be procured too soon, or by means which are too easy; and that such medicines as are most likely to slip through without stimulus, or irritation, must be the most proper, and most likely, to answer the end; but if the case be otherwise, if the first view should be to extricate the gut from its stricture, and the discharge of fæces is to be regarded only as a necessary consequence of such removal, then, I think, it is as clear, that such lenients are unfit, because unequal to the task; and that a power or faculty of stimulating or irritating the muscular coat of the intestinal canal, ought to be the property of whatever is administered.

That a depletion of that canal is a great and immediate relief to the patient, by unloading the belly, and lessening the tension, is beyond a doubt; and it is as true, that, without such discharge, the patient must perish, even though the stricture be taken off; but still the two objects are distinct and different, and the removal or extrication of the imprisoned piece is clearly the first.[m]

[m] It may not improperly, in this place, be asked, whether the operation of a purging medicine may not be different from either of these? and whether it may not be in an incarcerated hernia what it sometimes is in an ileus, where it often seems to act by overpowering that spasm which had begun to excite inflammation, and would soon bring on mortification? What still adds force to this method of reasoning is, the consideration of the great relief always obtained from a warm bath. Whether this be generally true or not, it is

When purgative medicines of any kind are given by the mouth, in the case of a strangulated hernia, and do not succeed in removing the intestine from the stricture, they are either rejected by vomit, or, by deriving an increased quantity of acrimonious fæcal matter downward, add to the pain and tension of the belly.

This is a very material objection to the use of all cathartics given by the mouth, and more especially to those whose bulk or quantity is at all large; and renders the application of such kind of medicines to that part of the intestinal canal which is below the stricture much preferable.

Indeed, the superior advantages of stimulating medicines, given per anum, are, in this case, many and great: they give much less disturbance to the stomach, they occasion no pain in the belly, nor do they at all increase the load or tension; they may be repeated frequently; and, what is of the most consequence, they may consist of such materials as cannot properly, or indeed safely, be given by the mouth. All these are manifest advantages; but the last circumstance is peculiarly so, for the tobacco-smoke cannot possibly be swallowed, nor would any man in his senses think of putting the infusion into the stomach, although it is well known, not only that both may be very safely administered in the form of clyster, but that they are the most powerfully efficacious and the most useful medicines we are acquainted with for such purpose.

I have mentioned the smoke and the infusion of tobacco as being equally useful, and have, from repeated experience, found them so.

Where a proper machine is at hand, or can easily be procured, I should certainly prefer the smoke to the infusion; because, the effects which both are apt to produce on the nervous system of the patient are, I think, lighter in the former than in the latter; but where such machine has not been at hand, nor could be procured without a loss of time, which, in these cases, is always precious, I have frequently used the infusion, and generally very successfully. The symptoms arising from the intoxicating quality

certainly well worth consideration. May not from this also be inferred the reason why opium, joined with purgatives, is sometimes, in the same disease, found to render the operation of the latter more successful?

of the tobacco, the languor, the cold sweat, &c. which this weed causes, more especially in those who have not been accustomed to it, are, as I have said, I think, rather more from the infusion than from the smoke; but, though I have often used it, I do not remember ever to have seen any ill effect from it. It generally makes the patient very sick,[n] and produces a fainting and a cold sweat, which, to those who do not immediately reflect on the intoxicating quality of tobacco, and the symptoms of such intoxication, may appear alarming; but, whether it be from the swooning, or from the irritation made in the intestinal canal, or, which is much more likely, from both conjointly, I have, several times, seen ruptures, which have resisted all attempts by the hand, return, of themselves, untouched, during the influence of such clyster.

Many other stimulating applications to the rectum I have, at different times, made trial of, but never found any at all equal, in effect, to the tobacco; nor did I ever see any of them produce that convulsive motion of the muscles of the abdomen, which most frequently accompanies the sickness attending the use of this weed, and which, although fatiguing and troublesome while it lasts, yet is certainly one of the means whereby the extrication of the portion of intestine is accomplished.

I have also several times seen them both fail, after fair and repeated trial. Whoever expects infallibility in medicine will be disappointed; but I can, with truth, affirm, that I have seen both the smoke and the infusion succeed much oftener than any thing else, and sometimes in very desperate cases.

CASE X.

I was desired to visit a ruptured patient with Mr. James, then surgeon to St. Luke's hospital.

The patient was a stout, healthy man, about thirty; the rupture was large, hard, painful, and beginning to be inflamed on the outside; no stool had passed for two days; the man had great pain all

[n] The infusion, which I have always used, has been made by pouring one pint of boiling water on one drachm of tobacco.

over his belly, and a frequent vomiting. Mr. James had many times tried to reduce it; he had bled him freely; and had given both purges and clysters, but all without effect.

The scrotum was exceedingly tense, and the pain which attended the most gentle handling was so exquisite, as not only to render all attempts for reduction, by the hand, improper, but hazardous.

It was about noon when I saw the man: every thing except the tobacco had been tried; the symptoms were advancing hastily, and the operation was proposed and submitted to; but, while our things were getting ready, we thought we might as well try the smoke clyster.

One ounce of tobacco was expended without any effect at all, either general or local; but, toward the consumption of another, the patient became sick and faint, and complained of a strange kind of motion in his belly, and also in his rupture. Upon turning the bed-clothes back, the motion was not only to be felt within the scrotum, but was even visible; this motion continued about two minutes, when the intestine, without being touched, returned; the man became immediately easy; and, in half an hour, had a plentiful discharge per anum.

CASE XI.

In the month of September, 1767, I was sent for in a hurry to some little distance from London, in order to perform the operation for the bubonocele.

I found a very large rupture on the right side, and that in so painful a state, as not to permit the most gentle handling. The patient had been treated with the greatest propriety, had been freely and repeatedly let blood, had taken purging medicines, clysters, &c. and had been several times in a bathing tub: his vomiting was frequent, he had a tendency to a hiccough, and he could not bear to extend, in the smallest degree, the thigh on the ruptured side.

The operation had been consented to before I had been sent for; but, upon my asking the gentleman who attended, if he had a ma-

chine for giving the tobacco-smoke clyster, and being answered in the affirmative, we determined to try it first.

When about half an hour had been spent in the continual impulsion of the smoke, the man cried out, 'My rupture is going up!' and, in the space of two or three minutes, it did so, with a noise which was heard by every one in the room.

CASE XII.

A GENTLEMAN, whom I had long known, had often showed me a rupture, which he had laboured under as long as he could remember, and which was now and then troublesome to him, because he could not wear a truss to keep it within the abdomen. It was of the congenial kind; that is, the sac of the hernia was formed by what should have been the tunica vaginalis testis. But his testicle, on that side, had never descended from the groin, but lay just on the outside of the abdominal opening; neither had the portion of intestine got any lower, so that both of them lay together: on which account, he not only never could wear a truss, but even the waistband of his breeches, if buttoned tight, was troublesome.

This gentleman was suddenly seized with the symptoms of a stricture, and those not slight, even at the first attack. The piece of intestine, though always in the groin when he was in an erect posture, had always gone up upon his going to bed, and was always returnable when he was supine. He tried now to reduce it as usual. He sent for me, and all my attempts were equally successless. His belly was very hard, he began to vomit, and the testicle became very painful to the touch.

All the circumstances were disagreeable, the symptoms advanced with uncommon rapidity, the portion of gut was small, the testicle inflamed and somewhat enlarged: an operation might become necessary, but could not, in such circumstances, be desirable.

He was bled freely, even to swooning; purging medicines were given, and immediately rejected; clysters had no effect, but were

as immediately returned; and the patient, knowing his own situation, was much alarmed.

Dr. de la Cour, who was his physician, was called in, and having tried the tobacco-smoke ineffectually, we agreed to throw up a pint of the infusion, made as before related. It soon made him exceedingly sick and faint, and caused a large discharge of wind, upward and downward, from which I expected a return of the gut, but in vain. At the distance of an hour, or two, the infusion was repeated, with the same effect of faintness and sickness, during which he was put into warm water; and when he had been in it a few minutes, the slightest application of the hand obtained immediate reduction, and stools.

CASE XIII.

The late Mr. Fullager desired me to go with him to see a wine-merchant in Billiter-lane, who had all the symptoms of strangulation in the case of a scrotal hernia, and whose rupture he had ineffectually endeavoured to reduce. I tried, and was also foiled. The symptoms were rather pressing. Mr. Smith, in Cheapside, who had been the apothecary to Mr. James's patient, was also apothecary here. It was determined that I should meet Mr. Fullager again, in about three hours, in order to perform the operation; and that, in the mean time, Mr. Smith should throw up the tobacco-smoke. At the appointed time we met, and found Mr. Smith employed as we had desired; I laid my hand on the rupture to examine the state of it, and it was wonderful with what facility it went up.

The same thing, exactly, happened to me with a coachman of the late Dr. Nicol of the Charter-house: but the same man, upon a return of the complaint, at about two years distance, was not again so fortunate; the smoke and infusion both failed, and the operation was performed; but too late.

It is as yet, with many, a disputed point, in the case of incarceration of a portion of intestine in a hernia, whether the stricture made by the tendon be original or consequential; or, in other

words, whether the disease be not originally in the intestine, and the stricture a mere effect of its dislodgement and distention. The arguments used in support of the latter opinion are by no means void of force, but at the same time I cannot think them conclusive. The perfect health and ease of many, nay of every body, immediately before a *sudden* descent, the very pressing and alarming symptoms with which such descent is often attended almost instantaneously, and the relief which reduction immediately produces in the majority of such cases, together with the immediate and total removal or dissipation of all the evils occasioned by the confinement, seem to prove the general opinion to be true.

On the other hand, the perfectly quiet, easy, and uncompressed state of the parts, in many instances, immediately previous to the invasion of bad symptoms, in cases where there has been no exertion of strength, nor any apparent accession of a larger and new portion of gut, are circumstances which, added to the incapacity of the tendon to contract, are well worth weighing, as they certainly give force to the former supposition.

As a mere point of speculation, it is not perhaps a matter of very great importance; but when considered as applied to practice, and influencing our conduct with regard to the chirurgic operation, it becomes very interesting indeed.

When the hand and the common means for reduction fail, the operation is our only resource, and if applied to in time, very seldom fails; so seldom, that I believe I might venture to say, not one in fifty[o] dies of it, if timely and judiciously executed; and when it becomes absolutely necessary, it is the *unicum remedium.* This consideration renders it a matter of still more importance; for as in cases where it becomes necessary and our only hope, it ought always to be proposed; for the same reasons, in cases where it is not necessary, it ought not to be thought of; and where it cannot be of use, it ought not to be done.

The intestinal tube, whether within the belly in its natural situation, or thrust forth from it in the form of hernia, is liable to diseases whose symptoms are peculiar to itself. Where there is no hernia, nobody doubts concerning the nature of the case; but

[o] I mean of the operation considered abstractedly.

where there is one, from the similarity of the symptoms, it always takes the blame; often deservedly, sometimes much the contrary.

In the case of old, unreduced hernias, there is no reason why the portion of intestine, forming such complaint, should be exempt from such distempers as the canal is liable to: on the contrary, it is reasonable to suppose, that by such unnatural situation and confinement, it would become rather more liable. But be this as it may, certain it is, that inflammation of the intestine, violent distention of it, with loss of peristaltic motion, and stoppage of stools, is sometimes the case in a hernia where the abdominal tendon has no share in the mischief; and as certain it is, that in such case the operator can do no good. In some instances this may, by attentive inquisition, be learned, and the operation thereby preserved from a disgrace: in others, it can only be known by its proving unsuccessful.

When the disease is the mere consequence of stricture, and the gut, previous to such stricture, was free from distemper, it seldom, I might almost venture to say never, happens: but that the setting it free is followed by a discharge per anum, especially if such intention be properly assisted. But when the disease was originally in the intestine, and the intestine either not bound by any stricture, or a stricture the mere consequence of the previous distemper of the gut, it most frequently happens that such discharge does not follow the operation, nor is obtainable by any means after it. This I have always regarded as a characteristic mark of the true nature of the malady; to which I think, from what I have seen of those cases, I might add another, which is the great difficulty, and, in some cases, impossibility of keeping the reduced intestine (after the operation) within the belly—a circumstance which I have seen sometimes to be absolutely impossible. In the cases where all the mischief arises from the mere prolapsus and stricture, the returned intestine becomes immediately pervious, and enjoying its peristaltic motion, keeps its place, and does its office; but where, by previous distemper, it is rendered impervious, and deprived of its motion, it cannot execute its office, it remains violently distended, and is, with great difficulty, kept within the belly, of which I could give many instances. This is, on several accounts, a matter of importance, both to patient and surgeon: with regard

to the former, it is not merely the alarm, anxiety, horror, and pain, which necessarily attend an operation of such kind, and of such serious consequence, and which, of themselves, are surely enough: but the distemper not residing in, nor being produced by the stricture, the necessary symptomatic fever attending such an operation must, in the nature of things, be a circumstance of additional hazard: and with regard to the surgeon, the difficulty of returning the distended intestine, and of keeping it in the belly after it has been returned, together with the most frequent, and indeed most probable, event of such case, render it very unpleasant, and what every man would choose to avoid. No man can command success; but every man would wish to be in the way of it.

CONGENIAL HERNIÆ.

The difference between these and other ruptures, is not a matter of mere anatomical speculation: there are in the former several particularities which require a practitioner's very serious attention, and which an operator ought always to be aware of.

The sac of a common hernia, every one knows, is formed by the protrusion of the peritoneum, through the natural opening in the tendon of the external, oblique muscle of the abdomen. This sac, at first, extends no further than the groin, but is, by means of its contents, gradually pushed lower and lower until it gets into the scrotum. It always lies anterior to the spermatic vessels, and is enveloped in the cellular membrane, which makes the tunica communis of the said vessels, forms a cavity perfectly distinct from the tunica vaginalis testis, and never does or can contain the testicle within it.

In the congenial hernia, the case is different: in this, the sac is not formed by the unnatural protrusion of a portion of the peritoneum, which ought to have remained within the belly, but is made by the unclosed vaginal coat of the testicle; consequently the said sac, constantly and necessarily, contains within it the testicle, together with whatever else may have passed from the abdomen to constitute the hernia, and which parts must therefore be in contact with the testicle.

From this particularity result some circumstances very necessary for a practitioner to be acquainted with. Such are the following:—

1. It sometimes happens, that, in infants, a portion of intestine slips down along with the testicle, prevents the closing of the tunica vaginalis, and thereby constitutes the disease.

2. It sometimes happens, that a portion of gut only comes down, the testicle never passing forth from the abdomen, or remaining in the groin, and falling no lower.

3. In this species of hernia a stricture, or strictures, are sometimes met with, which are formed merely by the contraction or coarctation of the neck of the vaginal coat or sac, independent of the abdominal tendon. And,

4. The parts contained in a common hernia are liable to contract cohesions with each other, or with the sac; but in the congenial both omentum and gut are liable to become connected with the testicle; which connexion will, sometimes, demand all the judgment and all the dexterity of an operator. So that, nice and delicate as the operation of a bubonocele is in the most simple and common case, it becomes much more so in the congenial rupture.

CASE XIV.

A boy, about fourteen years old, was taken into St. Bartholomew's hospital for a strumous, lumbal abscess, the matter of which had made its way out in the upper part of the thigh. The discharge was great, and the boy sinking apace.

While he lived I took notice of a particular appearance on one side of the scrotum.

The spermatic process, at its exit from the belly, was large and full, and plainly contained something which should not be there: immediately below the fulness, the process was of little more than its natural size; but just above the testicle, it was again considerably enlarged, and had the same feel as above.

The true state of the case remained in doubt till the boy died,

at which time both the swellings were become manifestly less than they had been.

I opened his body, and examined the parts with some care. The tunica vaginalis testis was open to the abdomen, and contained a considerable portion of omentum, which portion reached quite down to the testicle, but did not adhere to it: in the midway, between the abdominal opening and the testis, the hernial sac was so contracted, that the piece of caul, embraced by the contraction, was not extricable by any force, and was pressed into a firm, hard substance: above and below, it was soft and expansile, but void of fat, as in all emaciated subjects. This hernia, therefore, added to its other particularities, must have been incapable of reduction without an operation.

Much about the same time, Mr. Reiley, a very ingenious gentleman, who was then under me at St. Bartholomew's, showed me a congenial hernia in a child he had then in dissection, and in which a portion of intestine was begirt in the same manner, so as to be perfectly inextricable but by division of the part.

Had the child lived, and, at any time, been under a necessity of submitting to the operation for a bubonocele, this stricture, made by the sac only, and independent of the abdominal tendon, might have proved a very embarrassing circumstance in the operation, and have occasioned a difficulty which might not have been foreseen; indeed, upon a view of it after death, it appeared wonderful, how the intestine had executed its office during the child's short life.

CASE XV.

Thomas Lever, a lad about seventeen years old, was sent to St. Bartholomew's by Mr. Gray, of Colchester. His complaint was a rupture, which prevented his getting his bread, and which nobody in the country had been able to reduce.

The account he gave of himself was as follows: That he had had the rupture as long as he could remember; that it had always been down in the day, and up in the night, until within about six months past, when he had been thrown over a horse's head, and

bruised against the pummel of the saddle; that the blow gave him so great pain at the time as to occasion his swooning; that the pain continued some hours, and was followed by inflammation and swelling, which lasted some days; and that, from that time, he had never been able to get his rupture up.

The scrotum was large and full, but not at all tense: it plainly contained a portion of intestine, but there was no symptom, nor any appearance of the smallest degree of stricture. Upon attempting reduction, some part of the gut passed easily and freely into the abdomen, but a considerable portion of it remained, nor could by any means be made to follow. The testicle was very distinguishable below, and seemed to be of its natural size, and in a natural state, except that from the epididymis there proceeded a small, hard body, which body became tight when the returnable part of the gut went into the belly, and seemed to be what hindered the return of the whole. The boy was in perfect health, had no obstruction to his discharge per anum, nor any complaint relative to the intestinal canal. A part of the intestine was, as I have already said, returnable with the greatest ease; but even this would not remain a moment after the finger which returned it was removed, not even in a supine posture. A complete reduction was found impracticable—the parts were in such a state, that no benefit could be proposed from evacuation of any kind. To put a truss on was not only useless, but mischievous; and to leave a boy of seventeen, who was to get his bread by hard labour, with his scrotum loaded with intestine, liable, by every exertion, to be increased, and by any inflammation to become strangulated, could not be thought of.

It was therefore, after very mature deliberation, deemed advisable to give him the very probable chance of a cure by an operation.

The very easy return of part of the gut into the belly convinced me, that I must not expect to find any fluid in the sac; and the boy's own account satisfied me that the hernia was congenial, and had the tunica vaginalis for its sac.

I made my incision very cautiously, and found both these circumstances to be true. In the bag was a small portion of the ileum, and that part of the colon called the cæcum, with its ap-

pendicula vermiformis: the former was loose, but the latter was adherent to the epididymis and testicle. It took some little time to separate these connexions in such manner as to injure neither of the parts; but when that was accomplished, a very small division of the tendon served to obtain a complete reduction of the whole, and the boy went home well in about six weeks.

If this lad had not undergone the operation at the time he did, and inflammation with stricture had, at any future time, attacked him, his chance of preservation would have been but small. The adhesion would have rendered reduction impracticable; but this not being known, would have at least occasioned a waste of time in unnecessary, fruitless attempts, &c.; unless it may be supposed that, after such attack, the intestine could be rendered pervious and capable of executing its office by means of purging and stimulating medicines, (which in this situation of things I am not much inclined to believe,) it is clear, that nothing but the operation could have served him; which operation (the circumstance of adhesion not being known) would not in all probability have been proposed one minute too soon. Besides which, when all the parts were got into a state of inflammation, the separation of the cohesion might not, perhaps, have been executed so readily.

A case, in some degree like to this, was in St. Bartholomew's about a year ago, under the care of Mr. Younge. It was in a boy about eleven years old. His scrotum was much enlarged, and contained something of considerable size; but there was neither pain, inflammation, tension, nor impediment, in going to stool. Notwithstanding the absence of all bad symptoms, the boy, from the mere size of the tumor, was prevented from doing any thing, either by way of exercise or work.

The operation was performed: the hernia, which was congenial, was both intestinal and omental. I am sure I am within the truth when I say, that there were ten different adhesions of the omentum to the sac, and two to the testicle: nor was this all, for the upper part of the sac was so narrow, that it might well have been mistaken for a stricture made by the tendon.

Had the portion of intestine in this case been at any time increased, so as to have produced a stricture, bad symptoms would

soon have come on, and what trouble might not have been expected from parts so circumstanced, not one of which could have been known previously to the operation?

A sudden attack of great pain in the belly, attended with sickness and vomiting, and an incapacity of going to stool, imply the probability of a rupture being the cause; especially if the person so attacked either has at that time, or has had, one.

Pain in the belly, nausea, vomiting, and constipation, are the general symptoms of an obstruction in some part of the intestinal canal, and denote, among other things, a perversion, alteration, and, perhaps, sometimes, cessation of its peristaltic motion. They do not indeed point out what the particular cause may be; but, let it be what it may, if it be not soon removed, the patient must sink.

An incarcerated hernia, as it is called, is a disease caused by such stricture made on a part of the intestinal canal, as not only stops its proper motion, and prevents the passage of the fæces through it, but also hinders the circulation of blood through its vessels, and very soon induces a mortification.

The same symptoms have sometimes been produced by an inflammation, or by a spasmodic affection of the same part in persons who, if they have had a hernia, have not had any stricture in it; and also in persons who have had no hernia at all.

The great and material difference between the two cases is, that in the one the symptoms are occasioned by an affection of a part of the intestinal tube thrust forth from its natural situation within the belly, and begirt by a stricture; and, in the other, they arise from an affection of a part of the same canal, not begirt nor thrust forth, but remaining in its proper place. The general complaints attending each of these diseases are so alike, and are so very difficult to be distinguished from each other, that whenever they appear to any violent degree, the places in which herniæ make their appearance, ought always to be inquired into or examined, more especially in women; for, although the symptoms resemble each other so much, the causes of them are materially different, and render one an object of surgery, while the other is not at all so. Whoever reflects on these facts must see the propriety, or indeed

the necessity, of such inquiry as may determine the true nature of the malady; that a rupture, if it be the cause, may be immediately reduced; or, that not being the case, that the passio illiaca may be properly treated.

These circumstances are such, that the hazard or safety of the patient often depends upon them, and therefore require the very serious attention of the practitioner: but, material as they are, they are not all: there are others which equally demand his regard.[p]

A rupture doth not preclude or prevent inflammation or spasm, or whatever else may be the cause of mischief, from attacking any other part of the intestinal canal not included within the hernial sac; neither doth it prevent the same kind of evils from falling on that part of the intestine which is within the sac, and thereby producing mischief independent of the rupture, although affecting the part within, or causing it. And it also sometimes happens, that persons afflicted with unreduced or irreducible ruptures, are rendered incapable of discharging their fæces per anum, by causes which have not the least connexion with, or dependence upon the rupture, or the intestine contained within it. Thus it becomes a surgeon's care to endeavour to be able not only to know when a hernia is the cause of bad symptoms, but also when it is not; as his conduct upon these different occasions must be very materially different: for, on the one hand, if the mischief arises from the intestine being bound by a stricture, nothing but the reduction of it by the hand, or the setting it free by the chirurgic operation, can preserve the patient; but, on the other, if the symptoms proceed from another cause, even though the portion of intestine within the hernia should be the immediate seat of the evil, the attempts for reduction will be painful and vain, the operation at best useless, and most probably prejudicial; and, if the seat and cause of the mischief be not within the rupture, both the last mentioned attempts become thereby still more improper, more useless, and more pernicious.

[p] The observation of Platner, who says, "Nec facile inveniuntur notæ quæ ostendunt ex qua occasione intestina laborant," is strictly just and true.

CASE XVI.

An old gentleman, who had for many years had an irreturnable rupture of the mixed kind, and which I had often seen, was seized with the symptoms of an obstruction in the intestinal canal.

He complained of great pain in his whole belly, but particularly about his navel. He was hot and restless, and had a frequent inclination to vomit; his pulse was full, hard, and frequent; and he had gone, contrary to his usual custom, three days without a stool.

I examined his rupture very carefully; the process was large and full, as usual, but not at all tense or painful upon being handled; his belly was much swollen and hard, and he could hardly bear the light pressure of a hand about his navel. Upon mature consideration of the whole, I was of opinion that his rupture had no share in his present complaints. But as some of his symptoms resembled those of a stricture, I desired that more advice might be had. A physician and surgeon were called: I gave them an account of what I had seen of the case, of my opinion concerning the irreducibility of the rupture, and that it had no share in the present complaint: at the same time desiring my colleague to examine for himself. We tried at reduction without success, but he thought that there was still a stricture. The doctor ordered bleeding, clysters, and cathartics: the last were immediately rejected by vomit, and the clyster came away without any mixture of fæces. Bleeding was repeated *ad deliquium;* the tobacco-smoke was injected, but all to no purpose. The operation was proposed; but as the case did not appear to me to require it, I could not second the motion: it was, however, mentioned to the patient, who would not consent unless I would say that I thought it necessary, and believed it would be successful: I could not say either, because I believed neither. Every thing else that art could suggest or practise, was tried; but on the sixth day he died.

As it had been supposed that I was wrong and positive, I was very glad that his friends chose to have him opened.

The hernial sac was thick and hard, and contained a large por-

tion of omentum, a piece of the ileum, and a portion of the colon, all perfectly sound, free from inflammation or stricture, and irreturnable only from quantity. But the intestine jejunum was greatly distended, highly inflamed, and, in some parts, sphacelated.

CASE XVII.

John Dewell, a man about thirty, was brought into St. Bartholomew's, labouring, as was supposed, under an incarcerated hernia. He had not had a stool for three days, although he had taken both purges and clysters: he vomited almost incessantly, his pulse was hard and frequent, but not full, and his countenance bespoke death.

He had a rupture; it was on the right side, was clearly intestinal, was soft, easy, occasioned no pain upon being handled, and seemed to be capable of reduction; but after many trials, I found that I could not accomplish that end, notwithstanding I used my utmost endeavours; all which gave the man no uneasiness, and therefore satisfied me, that his symptoms did not arise from his hernia, which was also the patient's own opinion.

Mr. Nourse coming into the ward, I desired him to look at the man: he thought that, notwithstanding the seemingly quiet state of the rupture, a small portion of gut might be so engaged, as to cause his present mischief, and therefore that the operation was warrantable and proper.

Supposing it to be right at all, it could not be done too soon, and therefore we set about it immediately.

The hernial sac was formed by the tunica vaginalis: it contained a portion of intestine ileum, which had contracted a slight cohesion with the testicle, but was so perfectly free from stricture, that, when we had loosened it from its connexion, we returned it into the belly without dividing the tendon.

I was indeed afraid that the man would have died before we could have got him to bed, but he lived till the next day.

A portion of the colon within the belly had been in a state of inflammation, was now plainly mortified, and quite black.

CASE XVIII.

I was desired to be present at the opening of the body of a gentleman, whose disease and death had occasioned some altercation among those who had attended him.

The account given of him while living was, that to the age of fifty-six he had enjoyed an uninterrupted state of health.

That, at the age of forty, he discovered a rupture, for which he immediately took advice, and put on a truss. That the truss not answering the purpose, he soon threw it aside, and suffered his rupture to take its course. That it gradually increased until it became both visible and troublesome. That he then applied to Mr. Sainthill and Mr. Samuel Sharpe, both of whom endeavoured to reduce it, but in vain, and both advised him to wear a suspensory bag, which he, from that time, had constantly done. That from that time he had never complained of any uneasiness but what was occasioned by its mere weight. That he very seldom missed having a stool every morning. That about two years before his death, he began to complain of frequent pain about his bladder and fundament. That these pains had affected him near three months before he found any alteration in his fæcal discharge; but that from that time he had been constantly costive; and for the last six months had never passed a stool without a very stimulating purge, and even then with great difficulty. That he had frequently taken advice, had a variety of medicines prescribed, from none of which he ever reaped any other than the temporary benefit of purging. That in all this time no alteration had ever been found or perceived in his rupture, either regarding its size, or any other circumstance. That for seven or eight weeks before his death, he had worn a very morbid aspect, was become extremely emaciated, and had totally lost all appetite; his pains also being more frequent and more acute. And that, for the last week, he neither had, nor could obtain, any the smallest degree of stool.

This symptom had been, by those who were called to him last,

attributed to his hernia; and the operation had been much pressed on one side, and objected to on the other.

The hernial sac was old, large, and thick; its contents (omentum) much hardened; and a considerable portion of the intestine ileum both perfectly sound and unaltered, and not bound by the smallest degree of stricture. The stomach, liver, spleen, and small intestines, without blemish, but considerably distended; but about five inches of that part of the colon nearest to the rectum was so contracted, that it was quite impervious; and so hardened, that it was like nothing so little as a portion of gut.

CASE XIX.

A man, about forty, was brought to St. Bartholomew's with a supposed incarcerated hernia.

He had a very swollen, tight belly, a frequent pain and vomiting, and no stools; and this had been the case for three days, during which time very proper attempts had been made both for reduction and passage.

Neither the scrotum, nor the parts about the groin, seemed to indicate that the seat of the evil was there, although the parts were certainly too tense, and a portion of intestine was palpably in a hernial sac. It was Mr. Crane's week, who was out of London; and Mr. Edmund Pitt, who acted for him, desired me to assist in the operation, which was thought necessary, as no discharge per anum could be procured.

The hernial sac was of the congenial kind, and contained a portion of small intestine, which did not seem much, if at all, bound by the tendon, but it was so strongly and universally adherent to the neck of the sac, that it was impossible to think of separating it. A very unpleasant circumstance this. All that could be done was, to set it free from all possible stricture, and, if stools could be procured, to act afterwards as might be necessary.

Every means, of purge, clyster, &c. was used, but no passage procured; and on the fourth day from that of his admission he died.

The piece of intestine, in the hernia, was that part of the ileum nearest to the colon, and which was in good order, only adherent; but higher up, toward the jejunum, it was absolutely impervious for more than three inches in length.

I have seen two other cases so nearly similar, that I need not repeat them.

The following case has some circumstances which may possibly be worth the reader's notice.

CASE XX.

Thomas Marshall, aged fifty-four, was brought into St. Bartholomew's hospital, on the 25th of May, 1764, with a large, painful, tumefied scrotum. The account which he gave of himself was—

That in his childhood, he had been afflicted with a gut-rupture, for which he had worn a truss until the rupture was supposed to have been cured. That he had always been a regular, temperate, and hard-working man. That, on the 23d of April, he felt, while he was at work, a sudden, violent attack of a colic-pain, which, in a few hours, was followed by a slight purging. That, his pain not ceasing, he took some tincture of rhubarb, from which he had three or four more motions. That, in the evening of the second day, he found a considerable swelling in his groin and scrotum, on the side where his rupture had formerly been. That, on the third, he went to work again, although he had much pain in his belly, and a purging. That, on the fourth, he took something of the cordial kind, given him by a neighbour, and staid at home all that day and the next, during which he was pretty easy, but had several loose stools. That, on the seventh day from that of his being first taken ill, he went to work again, but was again attacked with severe pain and frequent vomiting: immediately after which, he found the swelling in his scrotum considerably increased. That, from this time, he was so much and so constantly uneasy, as to be obliged to keep his bed, it being the only place in which he could put himself in a tolerably easy posture. And that during the whole time, from the 29th of April to the 25th

of May, he had very seldom had less than two stools every day, often more.

The man was much emaciated, had a quick pulse, a hot skin, and considerable thirst: the scrotum was now very much on the stretch, began to put on a purple kind of colour, and had, at the same time, a watery load in its cellular membrane; but palpably contained a large quantity of fluid in the tunica vaginalis testis. The whole tumor had a pyriform kind of figure; the spermatic process was hard and large, and clearly contained something which passed into it from the belly; but which something did not descend below the upper part of the scrotum, while the lower part of the same was so distended, as to be half way down the thigh, and was palpably filled by a fluid.

The state of the parts was such, that it became necessary to do something, lest they should mortify. I made, with all possible caution, an incision through the loaded integuments into the cavity of the tunica vaginalis, and gave discharge to near a quart of the most offensive brown liquor: upon the discharge of this, the lower part all subsided, but the upper remained the same. I then, with a crooked probe-pointed knife, divided the whole from below upward, and found that the bag containing the fluid was a congenial hernial sac, whose internal surface had all the appearance of being mortified; and that the body, in its upper part, was a portion of intestine. This portion had, on its surface, several black and truly sphacelated spots; some larger, and some smaller; but the gut was still entire, and appeared moderately distended with wind. I passed my finger through the opening in the abdominal muscle, and could not find that it made the smallest degree of stricture; but found, at the same time, that the intestine was so firmly adherent to the sac, that, in its present state, it was equally impossible to return, as to detach it. That night the man had two good stools; and next morning, when I expected to have found him dead, he was considerably better.

I again examined the parts, to see whether the intestine could be returned; but again found that, had it been advisable, it was impracticable. The third day he was still better, and had a figured stool.

As it appeared highly improbable, that the mortified spots on

the gut should cast off without leaving a breach in the intestine, I thought that the best that could happen, would be a discharge of fæces through the wound, at least for a time: but I was mistaken; for at the end of five days, during which he had taken the bark freely, all the eschars cast off, by a florid good incarnation; and, leaving no breach at all, the man became easy, cheerful, and began to take nourishment.

From this time, the portion of intestine in the groin seemed daily to retire upward, and become less visible; and I began to entertain hope that we should see a very fortunate termination of this very miserable case. For the space of ten days he took the bark freely, and seemed every day better and better; but at the end of that time, he became again feverish and languid. Instead of his usual freedom of stool, none could be procured, and he died.

The prolapsed gut had retired so much, that, had the man lived, I make no doubt that it would have been included within the sore, and been firmly healed over: the places which had been sphacelated were quite healed; but about four inches of that part of the intestine, which was just within the belly, was so contracted as to become quite impervious, and perfectly scirrhous.

The intelligent will, I make no doubt, remark on some parts of this case; and therefore I shall trouble him with one only, which is, that sphacelated spots on the surface of an intestine are not always, and absolutely, a prohibition against returning such intestine into the belly.

CASE XXI.

I was desired to meet Dr. De Valangin, Mr. Godman, and Mr. Boigue, in the case of a hernia with stricture.

The patient was a man about the middle of life; his rupture was, I think, on his left side; and when I saw him he had not had a stool for several days, though the usual means had been used. Upon examining the parts, they made as bad an appearance as possible: they had been tumid, full, and inflamed; they were now sunk, flaccid, and completely mortified: notwithstanding

which, I could not say that the man appeared so near to death as such an appearance would indicate; but at the same time so materially ill that I could not suppose that he could receive any benefit from the art of surgery.

The true intent of the operation, that of setting the gut free from the stricture, was of no consideration here: the stricture had done all its mischief: if the man was to live, the mortified parts must cast off; and if he was to die, I thought it was better that we should not even appear to have a share in his death, by an operation which I thought could not be serviceable, and might be misconstrued.

This was truly my opinion, and I gave it as such. But, overcome by the importunity of the patient's wife, and to avoid seeming to be either careless or brutal, I was prevailed on to divide the parts. The scrotum, integuments in the groin, and hernial sac, were completely and truly mortified; the portion of intestine, which certainly was not less than three inches, was in the same state, sunk, empty, (having burst,) and as black as a coal; the offence was terrible, but the man suffered no pain, as the parts were totally void of sensation.

I contented myself with merely dividing the scrotum and hernial sac, and left the rotten intestine as it was, lying in the groin on the outside of the ring, concluding that a very short space of time would determine the poor man's fate, and that not favourably. The gentlemen whom I had met continued to attend, and to take care of him; the mortified parts cast off, he discharged his fæces through his wound for some time, but that, in no great length of time, ceased; and within the space of a month, I saw him in very good health, discharging all his fæces per anum, and having only a small, clean, and healing sore, where his wound had been. How the fæces passed from the ileum to the colon, after the mortified parts were thrown off, I am, considering the size of the portion of gut, really at a loss to account for; but very sure I am, that, if the advice given by all writers, in these cases, to cut off the piece of mortified intestine, and fasten the sound part to the upper part of the wound, had been followed, the man would have passed the remainder of his life in a much more unpleasant manner.

HERNIA VESICÆ URINARIÆ.

A HERNIA formed by a protrusion of a portion of the urinary bladder through the opening in the abdominal muscle into the groin or scrotum, is a disease sometimes, but not very frequently, met with.

It has been taken notice of by many writers of character, and has been accurately described by Mons. Verdier, and Mr. Samuel Sharpe.

Whoever is acquainted with the structure and disposition of the peritoneum, without which knowledge he cannot understand a hernia at all, knows that the bladder is only covered in part by that membrane, and that its inferior and lateral parts lie on the outside of it, in the tela cellulosa.

That portion of the bladder which is liable to this protrusion, is not covered by the peritoneum; consequently, when it is thrust forth, it does not carry with it any part of the said membrane; and therefore cannot have what is called a hernial sac; in which it differs from every other kind of hernia.

The two following are the only cases I ever met with.

CASE XXII.

A POOR fellow, who worked with a farmer at Islington, came to St. Bartholomew's with a large, troublesome swelling in his scrotum. The tumor was large, tense, of a pyriform figure, palpably contained a fluid, gave no pain but from its weight when full, and had every mark of a hydrocele, except that the testicle was perfectly distinguishable at its bottom.

While I was hesitating concerning this circumstance, the man said, 'Sir, I can get rid of it all by pissing, but it fills again in a a few hours, especially if I drink.'

Upon my seeming to disbelieve what he said, he took up his scrotum, and squeezing it together with some violence, discharged the whole by the urethra.

CASE XXIII.

A boy, about six years old, was seized with an acute pain about the region of the pubes: it lasted near an hour and a half, and suddenly ceasing, he became perfectly easy. During the time his pain lasted he could not discharge a drop of water, though he endeavoured so to do; but as it ceased he pissed freely. In a few days after, a small tumor was discovered about the size of a pea, in the spermatic process, just below the groin: it gave the child no pain, and therefore no notice was taken of it. By slow degrees it descended lower and lower, and as it descended, it seemed to increase in size. When it had got to the upper part of the scrotum, it was observed to be considerably enlarged; and the boy now found himself more frequently urged to make water, but without pain or diffiulty. He was examined by a practitioner or two in his neighbourhood, who, not knowing what to make of it, advised the letting it alone. Within the space of five years it got down to the bottom of the scrotum, and when it was there it was observed to increase much faster than it had done before. The boy was at a considerable distance from London, and it ill suited his friends to send him thither, so that another year passed before he was sent up; which was done at the age of thirteen, the swelling being now troublesome upon any motion.

Some, who first saw him, deemed it a scirrhous testicle, and advised castration, to which the friends of the boy would not submit.

From the most careful examination I could make, I could not think it was formed by the testicle; but on the other hand I could not find any testicle on that side.

The swelling was perfectly equal in its surface, was indolent, had a stony, incompressible kind of hardness, was troublesome from its weight, but never occasioned pain in the back or loins: it had all the appearance of being dependant from the spermatic process; which process, though it had neither the feel, nor the appearance of being diseased, yet was larger than it should be, and than that on the other side. The perfect equality of the tumor,

its being perfectly free from pain, even when pressed hard, and its extreme incompressibility, led me to believe it was not the testicle; but this was merely negative information. The trouble it now gave the boy, and its disposition to increase, seemed to authorise its removal; and the state both of the part and of the child were no prohibitions. I therefore proposed and undertook it. I made an incision through the skin and cellular membrane, the whole length of the process and scrotum, by means of which I discovered a firm, white, membranous bag, or cyst, connected loosely with the cellular membrane, in the same manner as a hernial sac. I dissected all the anterior part of this bag quite clean, and found that, as I traced it upward, it became narrower, and seemed to proceed from the upper part of the groin. This determined me to try if I could not clear it from its posterior connexion; in doing which, I discovered a testicle which lay immediately behind the body forming the tumor, and was small, flat, and compressed.

The dissection of this, and of the spermatic chord from the bag and from its neck, which I was obliged to do in order to preserve the testicle, took up some time, and gave me some trouble; but when I had finished it, I found that the cyst was dependant from, and continuous with, a membranous duct about the breadth of the largest wheat-straw, or what it was more like to, a human ureter, which passed out from the abdomen through the opening in the muscle.

When I had perfectly cleared this duct from all connexion with the spermatic chord, I cut it off immediately above the tumor; and upon the division there issued forth about four ounces of a clear liquor; and the mouth of the cyst, expanding itself, disclosed a stone, exactly resembling what is found in the human bladder.

As there was not the least appearance of fluid, either in the bag or in its neck, before the division, its immediate effusion, and the appearance of the stone, induced me to believe, that the case was a hernia cystica. In order to be certain, I staid some time; and when I thought that some quantity of urine might have passed from the kidneys, I desired the boy to try to make water: he did

so, and a large stream of urine flowing through the wound, instead of the urethra, put the matter out of all doubt.

He was dressed superficially, had no one bad symptom, though a portion of the bladder was totally removed: his urine came through the wound in his groin for about a fortnight; but as that wound healed, it resumed its natural course, and the patient has remained free from complaint ever since, except that the natural size of his bladder being lessened by the extirpation of a part, he is obliged to discharge his urine rather more frequently.

CASE XXIV.

AN OVARIAN HERNIA.

A HEALTHY young woman about twenty-three was taken into St Bartholomew's hospital on account of two small swellings, one in each groin, which for some months had been so painful, that she could not do her work as a servant.

The tumors were perfectly free from inflammation, were soft, unequal in their surface, very moveable, and lay just on the outside of the tendinous opening in each of the oblique muscles, through which they seemed to have passed.

The woman was in full health, large breasted, stout, and menstruated regularly; had no obstruction to the discharge per anum; nor any complaint but what arose from the uneasiness these tumors gave her, when she stooped or moved so as to press them.

She was the patient of Mr. Nourse. He let her blood and purged her, and took all possible pains to return the parts through the openings through which they had clearly passed out.

He found all his attempts fruitless, as did Mr. Sainthill and myself; and the woman being incapacitated from getting her bread, and desirous to submit to any thing for relief, it was agreed to remove them.

The skin and membrana adiposa being divided, a fine membranous bag came into view, in which was a body so exactly resembling a human ovarium, that it was impossible to take it for

any thing else; a ligature was made on it, close to the tendon, and it was cut off. The same operation was done on the other side; and the appearance, both at the time of operating, and in the examination of the parts removed, was exactly the same.

She has enjoyed good health ever since, but is become thinner and more apparently muscular; her breasts, which were large, are gone; nor has she ever menstruated since the operation, which is now some years.

END OF VOL. I.

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